

Industry Offers a Better Ride in Its 1934 Models

Independent springing, new weight distribution larger bodies and ventilation all help to make motorists more comfortable—Power stepped up again

TWO rather sharp departures from conventional practice stand out among the numerous innovations in car design for the 1934 season. These are independent springing at the front end and a much closer approach to true streamline forms in body types than has been offered in the past.

Although public reaction to any design departure cannot be predicted with absolute certainty, there can be little question regarding the chances of success of front independent springing. It makes little difference in the appearance of the car, and the esthetic factor therefore does not enter into the problem. Riding qualities, and especially the so-called boulevard rides, are improved, and the one objection to independent springing in the past, that of unpleasant swaying on turns, seems to have been well provided against in most of the models which will be independently sprung at the front this coming year.

Streamlining, of course, has both a practical and an esthetic side. As regards the reduction in air resistance made possible by it, the adoption of the feature will be hailed by motorists generally. Of course, in any practical automobile, perfect streamlines can only be ap-

by P. M. Heldt

Engineering Editor, Automotive Industries

proached, and there are several different methods of approach, some of which are open to objection on the basis of unsightliness or discomfort. The new models themselves give evidence, however, that the greatest care has been taken by the various engineering departments which have evolved bodies of this type, to avoid anything that might be displeasing to the eye, as well as to meet every legitimate comfort requirement. The public, moreover, has been educated to the advantages of streamlining for several years past, and there can be little doubt that it will regard the efforts to further refine body lines and reduce wind resistance with a sympathetic mind.

Improvement in riding qualities has been sought also by other means than independent springing, notably by a redistribution of weight. An important cause of passenger discomfort in modern cars is a fore-and-aft pitching motion produced when front and rear wheels pass

over the same road obstruction successively. This is a polar motion about a transverse axis passing through the center of gravity of the car, and the degree of discomfort resulting from it depends upon the frequency of the vibrations. This frequency, of course, increases with the stiffness of the springs, but decreases as the moment of inertia of the sprung mass around the axis of vibration increases. For the greatest comfort, the frequency must be low, and to lower the frequency, in addition to softening the springs (particularly the front springs), a number of manufacturers have shifted their powerplants forward, so as to move weight further from the axis of vibration, thereby increasing the moment of inertia and lowering the frequency.

In most if not all of the new models the engine power has been further increased, notwithstanding the fact that the average rating of last year's passenger car models was in excess of one hundred horsepower. In some cases this increase in output has been effected by increasing the displacement (either the bore or the stroke); more frequently by an increase in the compression ratio employed, while one

(Turn to page 793, please)

Independently Sprung

Standard and Deluxe series continued for 1934 with detail improvements including ventilation, appearance and comfort refinements, and voltage regulation on the deluxe models--Small bore engines available for export.

INDIVIDUAL suspension at the front wheels and increased power are the outstanding characteristics of the 1934 offerings of the Plymouth Motor Car Co. Plymouths are again being offered in two series, viz., the Plymouth Six, on which merchandising efforts are to be centered mainly, and the Deluxe Plymouth, the former having a wheelbase of 108 in. and the latter of 114 in. (which is longer than last year).

Numerous mechanical and body improvements of a detail character have been made in both lines, but particularly in the Deluxe series. The external appearance has been refined but not radically changed. Of major importance in this respect are the skirted front and rear fenders, a Vee-shaped sloping radiator with an ornament replacing the filler cap (now located under the hood), increased slant to the windshield, more side curvature to the roof, and new artillery-type steel wheels. At the front the sheet metal is carried down farther than formerly, the more effectively to conceal the running gear. Deluxe models are distinguishable from the Plymouth Six by two chrome-plated horizontal louver doors back of a group of conventional louvers in the hood.

Individual suspension has been taken advantage of to materially lower the rate of the front springs. A detailed illustrated description

of the Plymouth individual front springing appeared in the Dec. 16 issue of *AUTOMOTIVE INDUSTRIES* and this feature therefore need not be entered into here.

Steering effort required has been reduced by the adoption of cageless roller bearings for the support of the roller in the new worm-and-roller-type steering gear. The steering ratio has been further increased and is now 18.2 to 1. The sector shaft in the steering gear is mounted in oilless bushings.

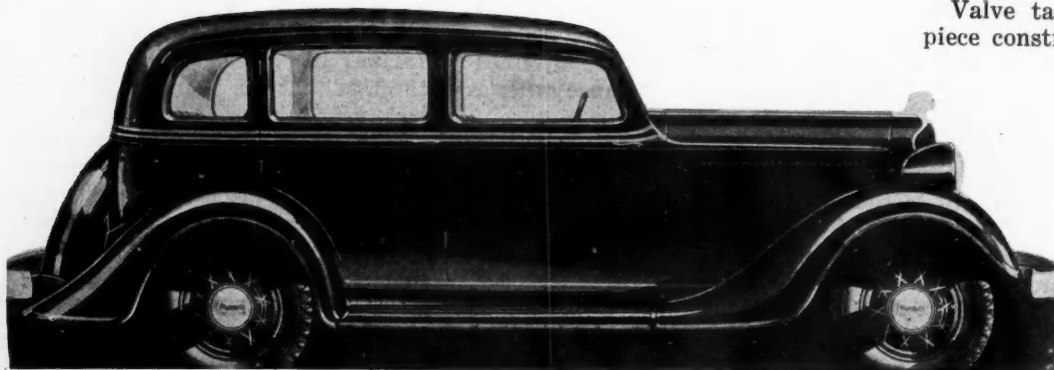
The design of the front end, including the suspension system and the steering gear, has been worked out with a view to preventing binding. Individual suspension virtually eliminates all tendency to shimmy and tramp. The lower rate of the front springs has reduced the frequency of vibration of the front end, and this is said to be within the range of frequencies at which the human body can be moved up and down without dis-

comfort. Rear springs on the Plymouth continue of the conventional semi-elliptic type, mounted at the front in rubber blocks and at the rear in silent-U threaded shackles.

The increase in the horse power of the new Plymouths is due principally to an increase of $\frac{1}{4}$ in. in the stroke. With the standard head, giving a compression ratio of 5.8 to 1, the engine is claimed to develop 77 hp.; with a Bohnalite aluminum head giving a 6.5 to 1 compression ratio, the output is said to attain 82 hp. at 3600 r.p.m.

Major changes in the carburetion system include the adoption of a more efficient intake silencer and air cleaner, and interconnection between the choke and throttle to assure a proper mixture for starting and to prevent overchoking. In the previous series the throttle was interconnected with the starter pedal. Thermostatic heat control to the manifold is retained but has been changed in detail.

Valve tappets are now of one-piece construction. Alloy cast iron



Plymouth Six four-door sedan, with new front end design and skirted fenders

ng Plymouths Have More Power

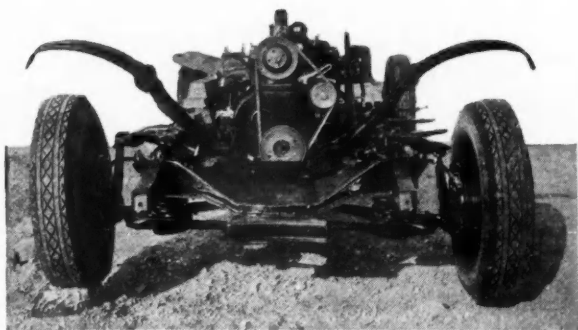
has been adopted for valve-seat inserts. Cast alloy camshafts have been adopted for the new Plymouth series. The crankshaft has five integral counterweights. Connecting-rod caps are now forged separate from the rods and are provided with a heavy rib for increased rigidity. Replaceable connecting-rod liners, featured last

higher charging rate when batteries are low and still prevent overcharging of the battery. The spark plugs (14-mm. type) now have two grounded spark points, instead of a single one.

The Plymouth Six carries a larger, 18-in. fan, the Deluxe model one of 17 in. diameter. On the Deluxe models the water circula-

Two detail changes serve to decrease the pedal pressure required, by reducing the friction in the operating mechanism. The release lever actuates the pressure plate through a "knife edge" block inserted between them. This block is guided in the clutch assembly so that it can rock, eliminating the sliding friction of the release lever at its normal bearing point. The bearing of the fulcrum pin of the release lever has been given considerable clearance, to reduce friction. It is provided with a spring take-up to prevent rattles.

A spring take-up has been provided also in the automatic clutch control, which latter is available at extra cost on the Deluxe series. This take-up automatically compensates for wear. Since the point at which the cushioning action in the vacuum cylinder starts is controlled by the piston position, wear



Front view of chassis showing independent suspension, front cross member and center mounting of fenders of the flexible type.

year, are retained. Connecting rods are slightly shorter than formerly, due to the use of a longer stroke with the same block.

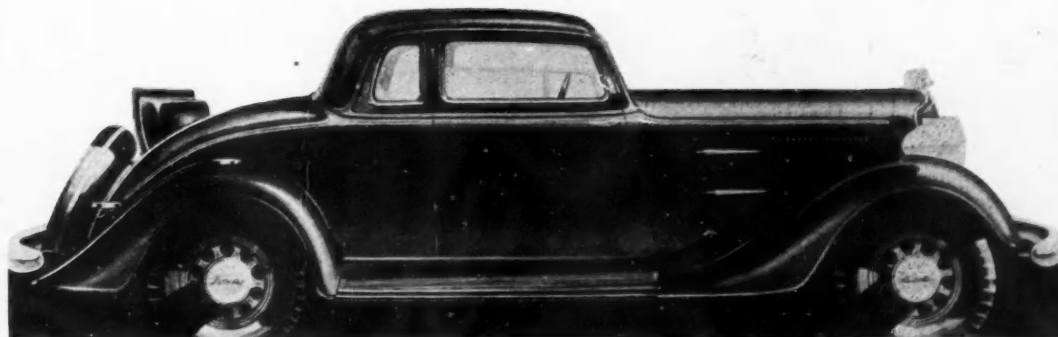
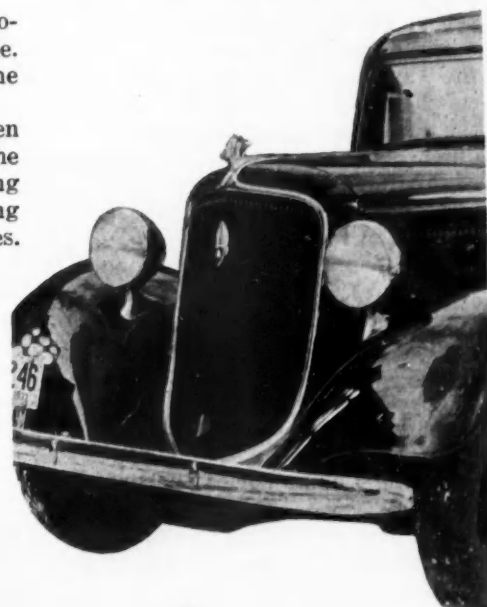
Engine mountings of the "Floating-Power" type have been modified slightly at the rear by placing the two rubber suspension points above rather than below the transmission. The alteration did not involve a change in location of the neutral axis however. On the Deluxe models the steady-rest below the rear of the engine—a rubber cushion on which the crankcase rests—has been retained. It has been dropped on the Plymouth Six.

Voltage regulation has been adopted for the generator on the Deluxe series, to permit of a

tion is now controlled by a thermostat on the by-pass principle. This assembly is available on the Plymouth Six at extra cost.

Clutch plates now have woven lining on the side toward the pressure plate and molded lining on the other side, the object being to equalize the wear on both sides.

Front view of the new Plymouth



Plymouth Deluxe rumble-seat coupe, showing how the entire window assembly, including center post, can be lowered. (Deluxe models are distinguished by the hood doors)

Changes in Plymouth Specifications

	1934	1933		1934	1933
Wheelbase,			Floating power,		
Plymouth Six	108	108	points suspension ..	2	3
Deluxe Plymouth..	114	112½	Camshaft material ..	Cast iron	Forged
Tires, Deluxe			Bushed bearings	3 front	Front only
Plymouth	6.00/16	5.25/17	Connect, rod length..	7 15/16	8 1/16
Front springs	Coil	½ elliptic	Crankshaft counter-		
Pivot angle	9 deg.	7 deg.	weights	7	4
Rear axle ratio,			Spring pressure,		
Plym. Six	4.11	4.375	valve closed	36 lb.	45 lb.
Service brakes, lining			Valve open	81 lb.	78 lb.
wheel	15 25/32	18 5/16	Cooling fan, diam....	18 in.	17 in.
Deluxe Plymouth,			Frame kick-up, front..	23½	47/16 in.
lining width	2	1½ in.	Steering gear type...	Worm and	Worm and
Tread, front	56⅞	56¼	Roller		Wheel
Rear	56⅞	56¼			
Engine, stroke	4¾	4⅞	Ratio	18.2:1	14:1
Displacement	201.3	189.8 cu. in.	Standard wheels,		
Std. ratio	5.8	5.5	Plymouth Six	Wire	Wood
Std. Max. hp.	77	70	Deluxe Plymouth..	Steelspoke	
Opt. ratio	5.5	6.5			
Max. hp.	82	76			

of the clutch facing will alter the engagement characteristics of the clutch. The spring, which is located in the piston rod (now split), takes up the slack in the clutch linkage produced by clutch wear and starts the cushioning action at the correct point with relation to actual clutch engagement.

Freewheeling is not provided on the Plymouth Six but is standard on the Deluxe Plymouth. During the past season, transmissions with quiet helical gears for all speeds were standardized for both models, and these transmissions are continued for 1934.

Propeller shafts are unchanged. Rear axles have chrome-molybdenum instead of chrome-nickel steel shafts. Rear-axle ratios are unchanged, except in the case of the Deluxe coupes, which now have the same ratio as the Plymouth Six. (4.11 to 1).

On the Deluxe series the brakes are wider. The lining of the "reverse" shoe is undercut at one end, to eliminate the tendency to chatter.

Aside from changes at the front end made necessary by the adoption of independent springing, and which have added materially to the rigidity at this point, the frame remains substantially the same. On the Deluxe, side rails are 1-in. deeper than formerly.

Air-wheel tires are standard on the Deluxe series for 1934, being mounted on artillery-type, steel-spoke wheels of 16-in. diameter.

Plymouth Sixes come with 5.25-in. tires on 17-in. wheels, as formerly, air-wheel tires being optional at extra cost.

What is probably the major body change is the adoption of an "air control" ventilating system on the Deluxe series. Crank-operated ventilating wings are located in the forward half of front doors and in rear-quarter windows of sedans. In the front doors there is a center post between front and rear glass. The rear half can be raised or lowered at any time regardless of the position of the ventilator wing. However, if the wing is closed and a small lever tripped at the center post, the entire window, including the center post, can be lowered in the conventional manner. The control for the rear ventilator is located above instead of below the window, to

avoid interference with the elbows.

Windshields are controlled in a new way through a concave steel 'ribbon' which winds on a crank-operated reel at the base. Cowl ventilator control is more positive than formerly. On the Deluxe models the windshields and ventilator windows are of Duplate glass. These are extra cost on the Plymouth Six.

Instrument panels are located at the left side of the instrument board, with control knobs in the center. On the Deluxe series there is a large glove compartment at the right, and a disappearing ash tray in the center. A two-unit radio is offered as extra equipment. If installed, the control is located at the center of the board (by removing the ash tray on the Deluxe series). Glove-compartment doors have a removable medallion, to permit installation of a clock. Both models now carry an engine-temperature indicator.

Interior trim has been refined. Side walls have embossed panels. Upholstery is of the wide-pleat (Turn to page 797, please)



Interior detail,
showing instrument
panel and windshield
control.

Oldsmobile Six Enters Lower-Priced Field

Both six and eight have independent front wheel suspension, all-helical gear transmissions and hydraulic service brakes

ECLIPSING perhaps in importance even the adoption of independent front-wheel springing is the announcement that for 1934 the Oldsmobile six will sell in the low-priced field. The eight, it is understood, will remain in the same price bracket as formerly.

The independent springing developed for the new Oldsmobiles is similar to the lay-out of the new Buick suspension system, steering heads being supported from the frame by two wishbone-type links. The materially softer springs used

at the front end of the new cars, together with a 2-in. forward shift of the new powerplants, are responsible for a greatly improved ride. The improvement is due chiefly to the elimination of pitching. Improvement in the ride is noticeable particularly in the rear seat. Still the front seat continues to have somewhat better riding qualities than the rear seat, owing to its more central location between front and rear wheels.

Hydraulically actuated Bendix duo-servo brakes are standard on

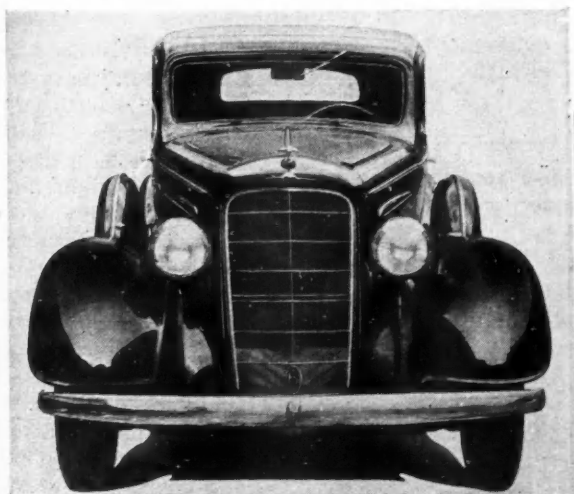
both the six and the eight, with mechanical control for the rear wheel parking brakes.

Except for the new front-end design the Oldsmobiles have not been materially altered in appearance. Front ends include a downward-curving, V-shaped, sloping radiator grille, brought down farther than formerly to completely conceal the running gear. Fenders are altered slightly, with deeper crowns, the front fenders being also somewhat longer. Corners of skirts are rounded off.

There is a much shallower trough between front fenders and hood.

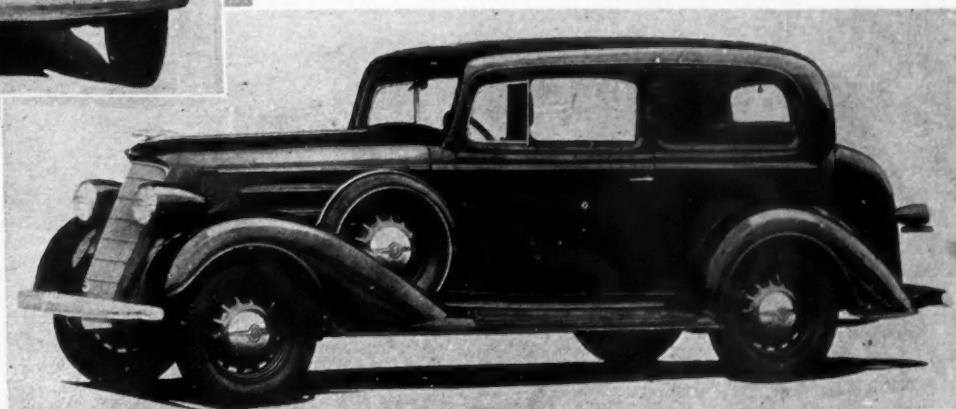
Radiator shells are wider than formerly. Wheels have an appearance of greater strength, and hub caps are larger. Radiator grilles on both models now have vertical fins, intersected by chrome plated horizontal bars.

On the touring models large trunks are actually built into the cars, being formed with the rear body panel. Hinges of no-draft



The new frontal appearance of the Oldsmobile Six

Trunks are stamped integral with rear body panels in "touring" models. Note also the V-shaped, sloping grille



ventilators are hidden from view.

Bodies on both Six and Eight are 2 in. longer than formerly, due to the forward shift of the engine. The wheelbase of the Eight remains unchanged, while that of the six is now 114 in. against 115 in. last year. As a matter of fact, the chief difference in appearance is due to the difference in size, the Eight being 2 in. wider and 5 in. longer.

In addition to independent suspension, the new Oldsmobiles have individual steering, independent tie rods extending to the two front wheels from a central intermediate steering arm mounted in anti-friction bearings on the front cross member.

Taking up the Six first, the horsepower and torque of the engine have been increased by improvements in the manifolding and an increase in the compression ratio from 5.5 to 5.9, in spite of a reduction of the bore from $3\frac{3}{8}$ to $3\frac{5}{16}$ in. Tests of experimental models indicate that at 30 m.p.h. this car will average close to 20 m.p.g.

Interchangeable connecting-rod liners, babbitt-lined and steel-backed, have been adopted for durability and ease of servicing. Batteries are larger, now having 17 plates and a rating of 100 amp-hrs. They are being charged by a new "lamp-load" generator which main-

tains a higher charging rate at higher car speeds, avoiding the usual, rapid drop above 30 m.p.h.

The pressure required to operate the clutch pedal has been reduced by two means. Digging in of throw-out fingers in the throw-out collar has been eliminated by making the latter unit of hardened steel. Throw-out fingers are mounted on knife-edge fulcrums, to reduce the friction.

Transmissions are now quiet in all speeds, helical gears having been adopted for the low forward speed and the reverse. These two combinations are obtained by sliding the mainshaft gear on helical splines.

Universals are now of the Spicer needle-bearing type and are sealed, since they require no lubrication attention for the life of the car. The rear-axle ratio is understood to be 4.55. The tread, now 58 in., is slightly narrower than last year.

Four-wheel hydraulic brakes were adopted for the new Oldsmobile Six. These are of the Bendix duo-servo type but actuated by hydraulic rather than mechanical means. Emergency braking is through a mechanical cable linkage to the shoes of the service brakes on the rear wheels. Drums are 1 in. smaller in diameter than last year.

Frames are of the same general type as on the 1933 six-cylinder series, but bracing between the X

member and side rails has been added. There is a new cross member at the dash, with braces extending up and bolting to the dash to obtain a more substantial frame-to-body bracing. The front cross member is entirely new and much more rigid than that previously used. Additional torsional strength is secured by offsetting the forward extension of the X-member legs in the side rails adjacent to the engine, thereby widening this box section.

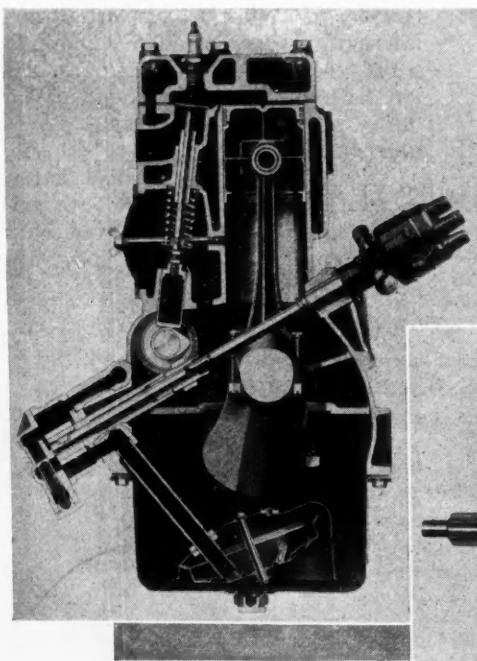
In addition to the provision of an individual link to each knuckle, a more efficient steering gear of the worm-and-roller type has been adopted. Furthermore, the overall ratio of the steering mechanism has been increased to 19.

The suspension system includes a stabilizer at the rear of the chassis, similar to that on the new Buicks. The torsion rod carries rubber-cushioned crank arms connected to the rear shock absorber arms. Rear springs now carry threaded bolts and bushings in the front eyes as well as in the rear shackles.

Shock absorber equipment is of Delco-Products manufacture, double-acting in front, single-acting at the rear. Standard tire equipment on the Six is 5.50/17 in., with low-pressure tires on 16 in. wheels available at extra cost. In view of the higher fuel economy the capacity of the fuel tank reduced one gallon to 15 gallons.

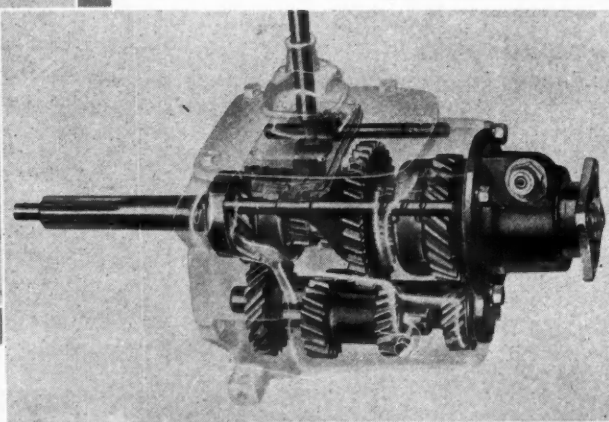
The 2-in. increase in body length already mentioned has been taken advantage of to increase leg room. Other new body features include a reverse cowl ventilator, which opens toward the rear, glove compartments provided with a tumbler lock and composition knobs on regulator handles and gear shift lever.

All the improvements found on the new Six are duplicated on the Eight, including the interchangeable connecting-rod liners, lamp-load generator, larger battery (17 plate 114 amp-hr. on the 8), reduced



(On left) Transverse section through six-cylinder engine

(Below) Phantom view of the new transmission which has helical gears for all speeds



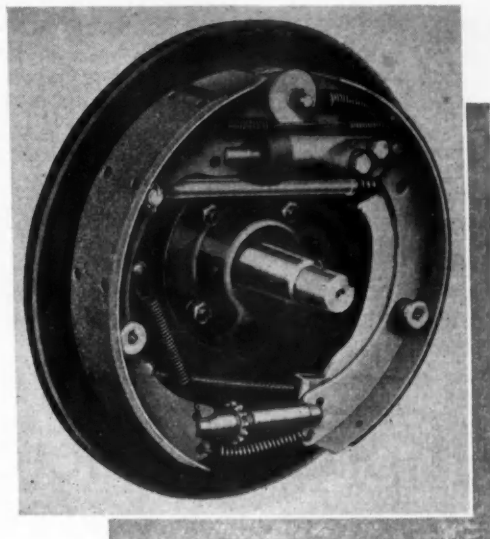
duced clutch-pedal pressure, all quiet transmission, needle-bearing universals, new frame reinforcements, hydraulic brakes with mechanical emergency to rear wheels (same size as last year on the eight), chassis sway stabilizer, threaded spring bolts and bushings for the rear spring; increased leg room, reversed cowl ventilator, locking glove compartment, and new knobs for regulators and shift lever.

In addition there are a number of refinements peculiar to the eight. Starting is through a solenoid operating the mechanical shift starter engagement. The circuit to actuate the solenoid is closed by pressing a button on the dash. Automatic chokes, which are now extra equipment on the six, are standard equipment on the eight.

The eight has a larger fuel tank (17½ gal.) a rear axle ratio of 4.77 to one, a steering ratio of 21:1, and 7.00/16 in. low-pressure tires with a new rib-type tread which reduces noise and eliminates tire squealing on curves at high speed.

Multi-beam headlights are standard on the eight. In the first position of the light switch the parking lights are lit up; in the second, both lower headlamp beams for city driving; the third position is for country driving and passing. In this position, either both upper beams are lit or the right beam is depressed with the left beam raised and illuminating the right side of the road. Operation is by means of a foot dimmer switch.

Hydraulic service brakes are standard on the new models. The parking brake is mechanically operated.



Interior trim in the eight is of a new type, upholstery material having wide pleats with a single row of oblong buttons giving a distinctive appearance. Door hinges on both models have been redesigned to decrease wind-noise.

Vacuum booster pumps, combined with the fuel pump, for more consistent windshield wiper operation at wide open throttle are available at extra cost on both models.

The eight is somewhat heavier than formerly, the Touring Coupe with built-in trunk weighing 3620 lb. as against 3470 lb. for the same model last year. This is due to the increased material used to assure torsional rigidity of the car. The reduction in the unsprung weight

is not very large. It amounts to 16 lb. on the six, and 13 lb. on the eight, or less than three per cent. This indicates that the improvement in riding qualities, which is quite marked on the new Oldsmobile, is due to softer springs, etc., rather than to any reduction in unsprung weight.

Body models available on both six- and eight-cylinder chassis include the following:

- 5-pass. touring coupe (integral trunk).
- 5-pass. coupe (without trunk).
- 5-pass. touring sedan (integral trunk).
- 5-pass. sedan (without trunk).
- 2-pass. business coupe.
- 2-4-pass. sport coupe.

Jacked Up

At least eight British car makers are said to have adopted permanent light weight jack equipment built in at the front and rear. The jacks are mechanically operated and readily permit the car operator to lift either end of the vehicle at will. Certainly sounds like a good talking point.

Bans Fatigue

Torsional fatigue, the inexorable enemy of hard working axle shafts, is said to be banished in the new "Truss-Grain" shaft made by Spencer. Although the details of its metallurgy are not yet forthcoming, it is said that the trade mark earns its name from the fact that grain flow is rearranged to an unique and controlled pattern. We

Production Lines—

expect to get at the technical facts very soon. Comparative tests of the new shaft versus ordinary shafts will be made at the New York Auto Show in January. Come up and see them perform.

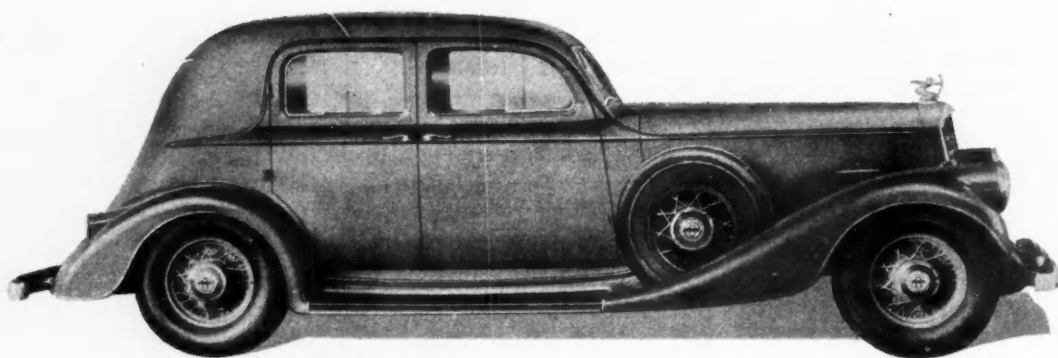
Swell Kink

Right from Detroit comes the dope on how to get specifications on steel without incurring the "specification extras" of the Steel Code. Here's what one large auto manufacturer does with chrome moly steel: He buys an entire heat, splits it up into several sections graded according to quality. This

is done not only by separation of ingots but by actual cutting of ingots to grade the material according to chemical analysis. The highest grade goes into the coil springs for the independent suspension, an intermediate grade for axle shafts, another grade for transmission gears, and the "lowest" grade into rear leaf springs, where minimum stress occurs.

Checks Mileage

Zenith has come out with a compact, portable fuel tester for checking the economy of commercial vehicles. To our mind this is a mighty fine device to supply to passenger car service stations as well. It should be a valuable factor in gaining the good will of car owners who are insistent upon the best possible economy. J. G.



Silver Arrow
model offered on
840 and 1240
chassis

Improved Pierce-Arrows Carry Prices Averaging 8% Higher

Bodies are roomier, draftless ventilation provided, frames are stiffer and rear axles have hypoid reduction gears

PIERCE-ARROW during 1934 will produce three distinct lines of cars, two on twelve-cylinder and the third on an eight-cylinder chassis. Prices average about 8 per cent higher than last year, ranging from \$2,795 to \$4,495.

Aside from more pronounced streamlining, the chief developments in Pierce-Arrow cars for 1934 are roomier interiors (nearly 4 cu. ft. more room), airplane type insulation, draftless ventilation, adjustable seats in rear as well as in front, more rigid frames with full-length box-girder side members, hypoid rear axles instead of worm type, easier control, and greater power in the eight and the shorter twelve. Free-wheeling and Stewart-Warner full power brakes are continued.

The eight-cylinder chassis, known as Model 840, comes in two lengths of wheelbase, 139 in. and 144 in., as compared with 136 and 139 in. last year. Included among the body types furnished on this chassis is a moderately priced Silver Arrow. The eight-cylinder engine has a bore of $3\frac{1}{2}$ in., and a stroke lengthened by $\frac{1}{4}$ in. to 5 in. (385 cu. in.) and develops 140 hp. at 3400 r.p.m.

The Model 1240 group of cars, in addition to the conventional body styles, also includes a Silver Arrow. The chassis of this group also comes in two lengths of wheelbase,

139 in. and 144 in. The $3\frac{1}{2}$ x 4 in. twelve-cylinder engine develops 175 hp. at 3400 r.p.m. Last year the engine in this model was $3\frac{3}{8}$ x 4 in.

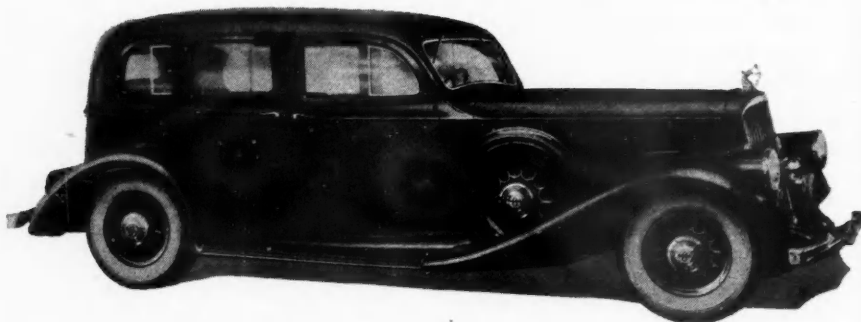
The third group of cars, the most expensive Pierce-Arrow line, comes on the Model 1248 chassis with a wheelbase of 147 in. The bodies of this line are quite conservative and formal. This chassis carries the same twelve-cylinder engine as the Model 1240.

All engines are mounted on rubber biscuits and washers, symmetrically located about the center of the engine. There are two points of support at the front, two at the ends of a plate-type engine bearer clamped between the engine block and the bell housing, and two at the rear of the transmission. Automatic hydraulic valve lifters are continued.

Frame side rails, as already men-

tioned, are now of box section. They are built up of channel sections which are welded together at points 6 in. apart, making practically a one-piece structure. Three are seven cross members, three of which are tubular type.

According to an announcement of the Ford Motor Co. A. G. of Cologne, Germany, all four-cylinder Ford cars produced by it (of 4/21, 13/40 and 13/50-hp. rating) are of exclusively German production, as confirmed by investigations made by two members of the German Society of Engineers and by the Chamber of Commerce and Industry of Cologne, and will in future bear the legend "German Product" under the name "Ford" on the nameplate. For the Ford eight, it is admitted, important parts continue to be imported.



Long, clean lines feature this Pierce-Arrow sedan

JUST AMONG OURSELVES

More Order in Our Action

"All's quiet on the Potomac." The automobile manufacturer's NRA code has been renewed until Sept. 5, 1934, merit clause and all. Calm thinking prevailed over turbulent feelings. Several weeks ago we wrote here: "Our conviction grows that the document will be signed again, because many heads seem to be growing cooler" That's just what happened and the industry with its experience of four months' code operation behind it, will be better able to meet code problems in the period ahead.

Some such thought seems to be embodied indirectly in the statement made by William S. Knudsen, G.M.'s executive vice-president, the other day when he said:

"It is a healthy thing for American industry to have labor as a group thinking, and thinking constructively from the standpoint of improving conditions.

"A few months ago there was a great deal of action on the part of industry and on the part of labor generally to remove some of the barriers that have grown up. Lack of sufficient order in this effort, however, threatened to disrupt the understanding between management and labor which this very action was designed to promote We now are injecting the necessary order into this action and I am confident that out of this will come a relationship between management and labor based on a mutual understanding of each

other's problems—in contrast to a policy of conflict of interest."

Certainly the labor problems of the industry are not behind us, but the basis for consummation of better relationships does seem to be in the making.

* * *

Service Profits Here to Stay

Every so often we like to check up again on how factory men are viewing the service end of the dealer's business. When we first got into this industry back in 1919, every manufacturer viewed service solely as an aid or adjunct to car sales. Only the independent repairman looked upon it as a profit opportunity.

Six or eight years ago we first ran into a factory sales executive who actually urged his retailers to build their service departments into profitable divisions and, wherever possible, to set themselves up to handle the one-stop services through which so many owners were being drawn to independents and to filling stations.

Dealers themselves have been slow to see the possibility—if not the necessity—of establishing service on a profitable basis. The relative stability of service income in bad times and off-seasons, though, has kept many a dealer in business who otherwise might have gone out.

Today a good many factory men see this side of the picture—sometimes so clearly as to make them urge profitable service on their retailers even at the expense of slightly less im-

mediate attention to car selling. But factory thinking on this important point still remains very much divided. Service development is all right for depression times, some factory men think, but it should be little more than a help to car sales once business gets good again.

Personally we incline strongly to the opinion expressed to us by the sales vice-president of a big independent car company when he said something like this:

"I really believe that service operations will, in the future, produce a larger part of the net income of the average car dealer. There are many arguments against this statement but during the past three years the average dealer learned for the first time that his service department could be a source of profit rather than merely a necessary evil. Consequently, he has given it more thought and done more things to get service business than ever before. He has had a 'taste of blood' in the way of profit—and you know what that means."

* * *

Four Big Reasons for Accidents

"The majority of mishaps on the highways," said Robert Graham, recently, "are caused by violation of one or more of four fundamental laws and the rules of good driving." Here are the fundamental traffic laws which, Graham-Paige's executive vice-president thinks, must be made more general:

1. Slow down at intersections
2. Observe signal lights
3. Make turns properly as prescribed by traffic rules
4. Grant the right of way

Here's wishing Mr. Graham luck in his efforts! It might be sensible for all traffic improvement efforts to concentrate on these four simple things.

N. G. S.

1934 Auburn features include improved appearance, ventilation, all-steel bodies, huskier frames, aluminum heads, better riding and synchronizing shift for dual ratio axles

Auburn Supplements Improved Eights

THE Auburn line for 1934 will comprise three passenger-car chassis, a Six, an Eight, and a Twelve. Both the Six, which has a wheelbase of 119-in., and the Eight, with a wheelbase of 126-in., will be offered in a standard and a custom line. The Six, by the way, is listing at the lowest prices in the history of the company. Improvements have been made in the Eight in both the design of the bodies and in mechanical details, while the Twelve is being continued substantially unchanged.

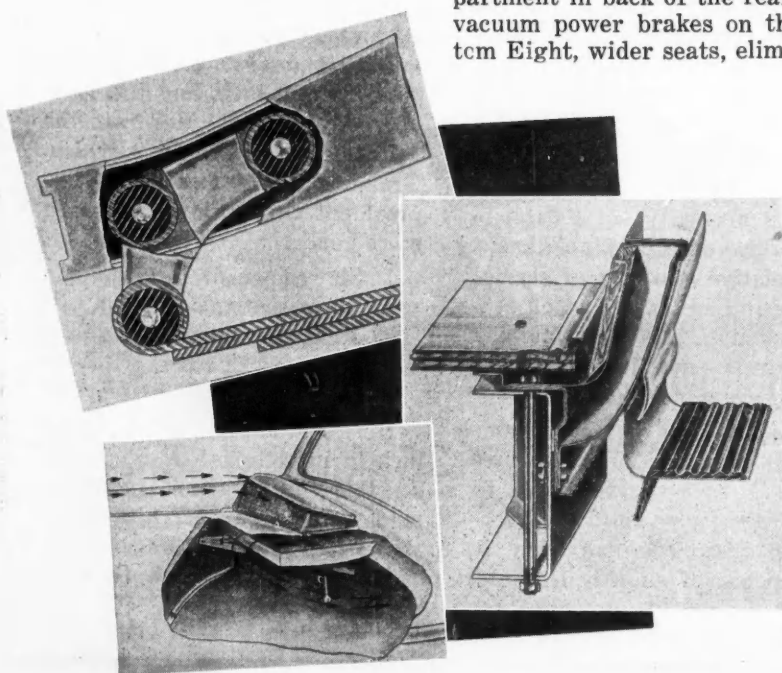
Dual ratio, a major sales point during the 1933 season, is standard on the Custom Eight only, according to plans at the time this is written. The mechanism has been provided with a synchronizing clutch similar in principle to that used in transmissions in recent years.

Huskier frame design, permitting material weight reduction; elimination of body sills, allowing a further lowering of the center of gravity; all steel bodies; a three-way ventilation system for the bodies; an accessible luggage compartment in back of the rear seats, vacuum power brakes on the Custom Eight, wider seats, elimination

of drip molding on roof side panels, direct-acting shock absorbers and new sheet metal throughout are a few of the details incorporated in the new models.

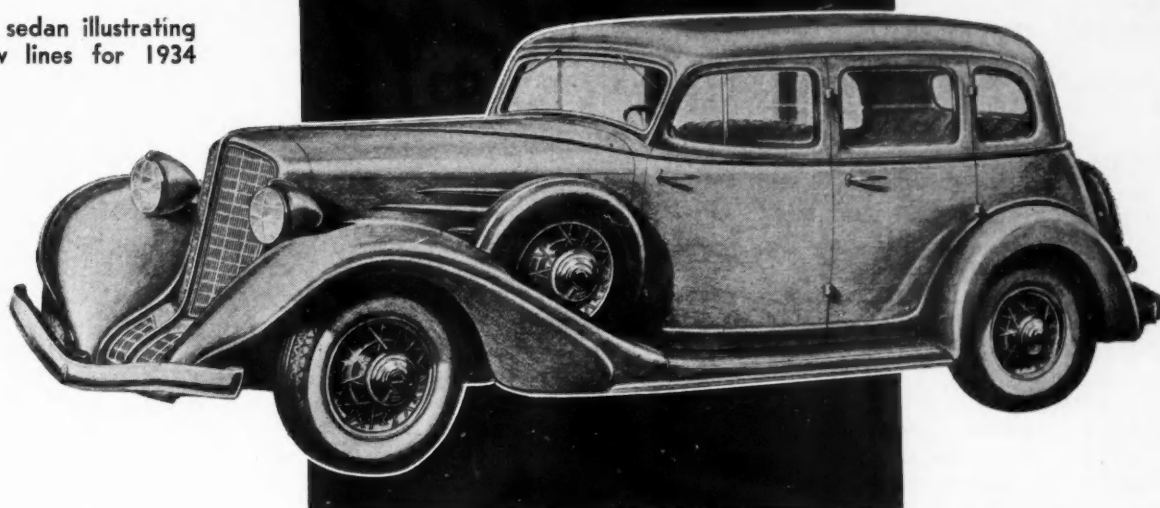
Body lines are distinctively new. Radiator fronts are V-shaped and have cast grilles with rectangular openings, lacquered on Standard and chrome plated on Custom models. Below the main grille are two smaller grilles behind which are air scoops which increase the air circulation through the engine compartment, improving cooling as well as appearance. Filler caps are under the hood. The latter has a small number of wide horizontally curved louvres. Fenders are of the skirted type and have embossed panels in contrasting colors.

Hoods overlap the cowl to a considerable extent, producing a narrow cowl side panel without decreasing leg room. Doors are wider than formerly and are provided with additional dovetails and rubber sealing strips at the top. In consequence of the adoption of the new car ventilating system, the windshields are locked in place and rubber sealed. Safety glass



Upper left—Three rubber bushings take the place of springs in this kick shackle. Lower left—New V-shaped drip-proof cowl ventilator. Right—Method of attaching body to frame eliminating sills

Auburn sedan illustrating
the new lines for 1934



hts with Low-Priced Sixes

is standard in windshields. Roof side panels are distinctive in that they carry no drip moldings. A "rain deflector" bead, however, is stamped into the panel. Chrome molding trims the running boards and lower edges of front fender skirts on the Custom models.

Rear body panels have a considerable backward slope, resulting in the aforementioned luggage compartment back of the rear seat when trunks are not recessed into this panel. This compartment is made accessible by hinging the back of the rear seat at the top and providing a pull strap at the lower edge of the seat-back. Gas tanks are located under the body and are completely concealed. Filler pipes run through the rear of the body back of the rear seat corner.

Instruments other than the speedometer are grouped under a glass of the same size as the speedometer, at the left of the instrument panel. Edge lighting of instruments is provided on the Custom Eight. At the right there is a large glove compartment. Provision for radio installation is made at the center of the panel. Cowl ventilators are completely screened, large, and provided with a drain so that they may be used in rainy weather. Dual wipers are standard on custom models. Ash trays are inset in the lower windshield header bar above the instrument board. Windshields are higher than usual of late, improving the driver's vision which is of impor-

tance particularly in hilly country and for traffic-signal observation.

Front-door windows are divided by a center post into two sections. Control is by a single crank and a toggle lever which latter, in one position, permits lowering of the front half independently, in another the rear half only, and in the center position permits lowering of the entire window including the center post.

Rear-quarter windows in sedans are of the fore-and-aft sliding type, crank-operated, to permit ventilation of the rear either by suction or by pressure from the outside. Windshield wings are optional equipment at extra cost.

Body side panels are recessed at the rear seat for more elbow room. Rear shades pull up instead of down, making for neater appearance. There is a mechanical anti-theft lock on the steering wheel. All bodies are wired for radio. Roadsters now have full rumble seats, instead of the pointed tails characterizing recent Auburn roadsters.

Front seats and steering columns an adjustable Luxury cushion springs are used on the Custom Eight. Upholstery is mohair on the standard Six and broadcloth on the other models.

Bodies are of the all-steel type, except the Brougham, which contains a limited amount of wood. Cowl structures are particularly husky, with the dash curved forward on both sides of the engine

pocket for additional strength. Moreover a new crossmember in the frame at the dash has vertical braces which bolt to the front of the dash.

Bodies are bolted directly to the outside of the frame side rails eliminating body sills. A shallow tunnel provides the necessary clearance for the propeller shaft with the low-over-all height of the car.

Heavy fender braces support the Spicer direct-acting shock absorbers and the headlamps, which latter are recessed slightly into the fender for neater appearance.

Frames now have box sections fore and aft of the center X-member. Incidentally, the legs of the X-member now overlap at the center where they are riveted together, giving a more substantial construction than the former fish-plate assembly. On the Six, in addition to the new dash member there is a crossmember ahead of the radiator cross-member, making a total of four in addition to the X.

On the Eights the X-plus-A frame design developed last year is continued with the additions mentioned. A tubular member is provided at the rear kick-up, being welded into the box section side-rails. With this design it has been possible to reduce side-rail stock thickness to 9/64 in. on the Six and 1/8 in. on the Eights—making for lighter weight.

As far as powerplants are concerned, the accompanying specifications give the major dimensions. In general design the Six and Eight are very much alike, and in fact most parts, including valves, pistons, rings, rods, etc., are interchangeable between the two.

Aluminum Bohnalite heads are standard equipment on the two Sixes and on the Custom Eight and contribute to the high output, along with a downdraft Stromberg carburetor (Duplex on the Custom Eight) and a Swan type of manifold. Spark plugs with 14-mm. thread are used with the aluminum heads. Electrical units are supplied by Autolite and include a fan-cooled generator.

Water pumps are of the packless type, produced by Logan Gear Company. Features of engine design include a water distributor pipe in the block for more direct cooling of exhaust valves, invar-strut Bohnalite pistons, twin V-belt drive at the front end in combination with a short Whitney camshaft chain, Float-O oil intake for the oil pump, four-point rubber mounting, Lanchester damper, two Perfect Circle 85 oil rings per piston, crankshafts counter-balanced front and rear to reduce loads on end bearings, automatic manifold heat control, bronze-backed main bearings with complete circular grooves, 14-mm. spark plugs, single-breaker distributors, Startix automatic starter engagement, removable valve

guides, Purolator oil filter, Burgess intake silencer and air cleaner, crankcase ventilator with outlet through valve chamber cover, and a smaller water jacket opening to increase block rigidity. All valve springs are ground square under compression. Pistons are removable through the bottom of the bores. Clutch housings are integral with the block.

The eight-cylinder engine has steel front support arms bolted to the chain cover. Rear supports of both engines are at the transmission. In comparison with the former Auburn Eight, the new engine has materially heavier cylinder walls. Valves are larger and less inclined toward the cylinder axes.

The Standard Eight engine has a conventional iron head with 18-mm. plugs. On the eight-cylinder engine there is provision in the crankcase for a power take-off from the camshaft for driving either a mechanical windshield wiper or a tachometer.

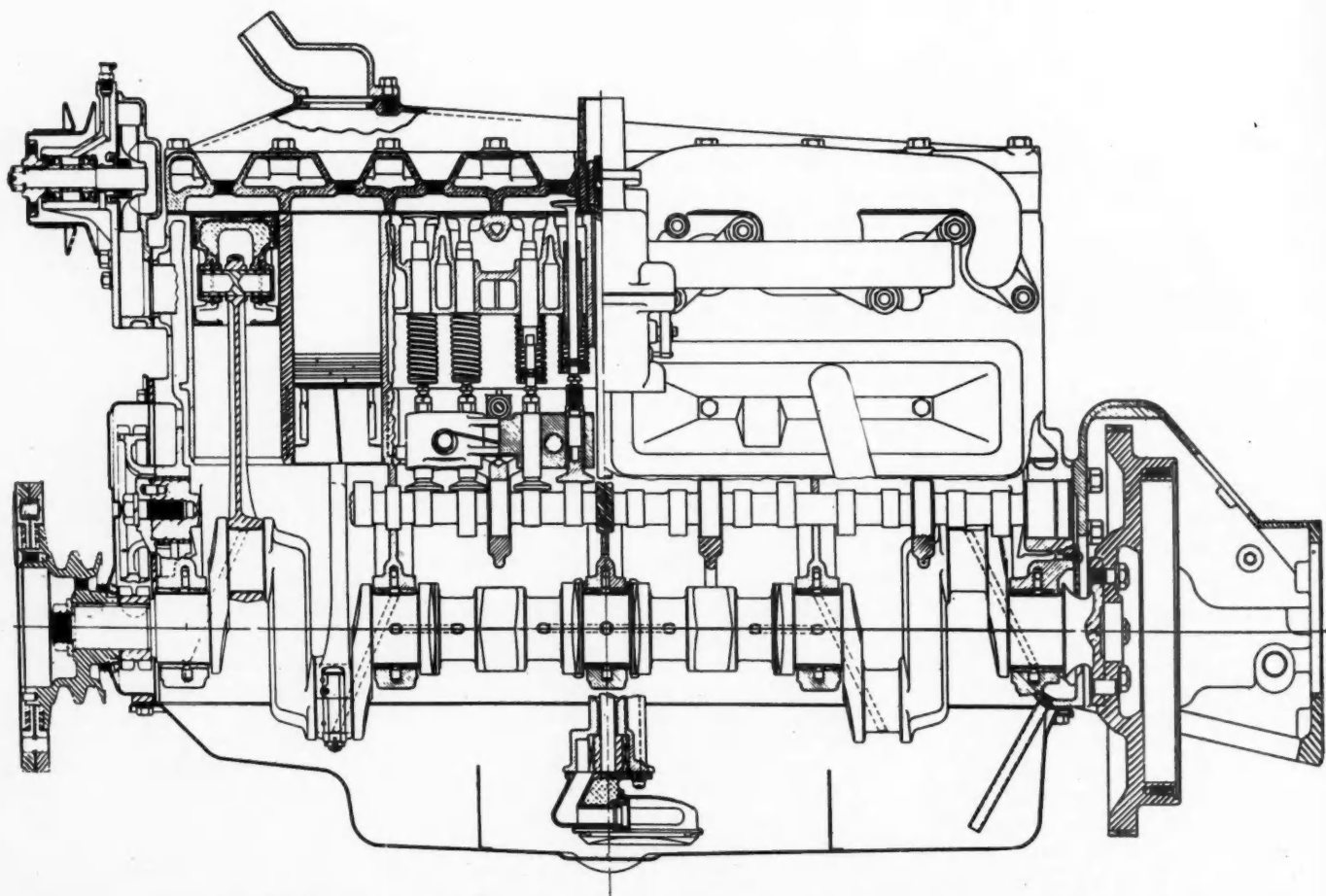
A Long 9-in. single-plate clutch with cushion springs for torsion, a Warner Gear synchro-shift transmission, Mechanics-Machine sealed needle-bearing joints requiring no

lubrication attention, and Columbia axles comprise the drive mechanism. Axles now have shim adjustment for the pinion. The standard ratio probably will be 4.7 to 1, although this had not been definitely determined at the time this was written.

All springs are rubber-bushed and provided with spring covers. An ingenious kick-shackle, depending for its action entirely on the elastic deformability of rubber and comprising no steel springs, has been worked out for the left front spring. All springs are shackled at the rear.

The emergency brake lever connects through cables to the rear-wheel brakes of the Bendix duo-servo hydraulic service brakes. Drums are Centrifuse. There is a ball thrust bearing in each steering head. Steering gears are of the Ross cam-and-lever type, roller-mounted, with an overall ratio of 18 to 1. Wire wheels (Motor Wheel) are standard on both lines, with 5.50/17-in. tires on the Standard Six and 6.00/18-in. on the Custom models. White side walls have been dropped.

Clutches on the Eights are Long 10-in., with cushion springs.



Longitudinal section of engine used in the Auburn Eight. The new six is of similar design

Throwout bearings are exceptionally large. Transmissions are similar to those used in the previous series. Freewheeling of the LGS type and Bendix automatic clutch control with pendulum cushioning valve, and automatic wear compensator in the piston rod, are standard on the Custom Eight only.

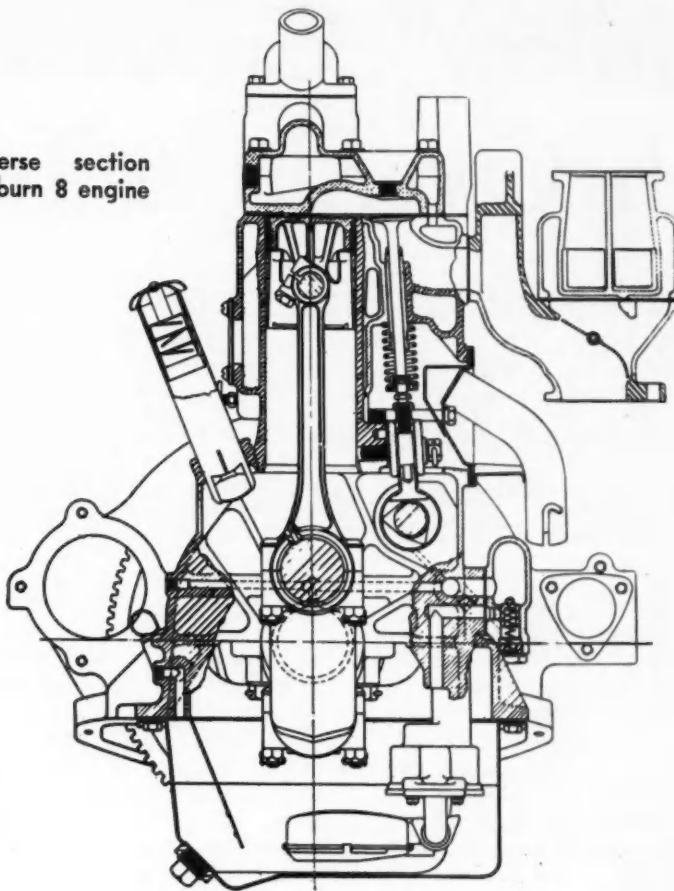
The Eight also has Mechanics sealed needle-bearing universals and a semi-floating Columbia axle. The dual-ratio mechanism standard on the Custom Eight is similar in design to last year's offering, except for the addition of a multiple disc clutch running in oil which synchronizes gear speeds before completing the engagement—thereby eliminating the "clunking" sound characterizing last year's units, and increasing the life of the mechanism. The pre-selective control for this unit has been moved to the steering column for accessibility.

To avoid the confusion incident to a double-scale speedometer, as formerly used with the dual-ratio axle, the speedometer drive in the Custom Eight is taken off the axle shaft. Brakes are similar to those on the Six but have wider drums. A Bendix vacuum unit is standard equipment on the Custom Eight.

Springs, front axles and steering mechanism are similar to the corresponding units on the Six, except for dimensions. Front springs on the Eight are 5 in. longer than last year. Chassis lubrication on both the Six and the Eight is by pressure gun, using the new type Alemite cups.

Sixteen-inch wire wheels are standard on both Eights, with 6.00-in. tires on the Standard and 6.50-in. on the Custom line.

Transverse section
of Auburn 8 engine



Auburn 6 and 8 Specifications

Model	Eight	Custom Eight	Six
Wheelbase	126 in.	126 in.	119 in.
Cylinder Bore	3 1/8 in.	3 1/8 in.	3 1/8 in.
Stroke	4 1/2 in.	4 1/2 in.	4 1/2 in.
H.p. Output	100 @ 3400	115 @ 3600	85 @ 3500
Compression Ratio	5.3	6.2	6.2
Cylinder Head	C.I.	Al.	Al.
Carburetor Make	Stromberg	Stromberg	Carter
Size and Type	1 1/2" single { downdraft {	1" dual { downdraft { Dual Ratio	1 1/4" single { downdraft {
Rear Axle Ratio	4.45	{ 5.1 & 347 { 16 x 6.25 { 16 x 6.50	17 x 5.50
Tires	16 x 6.25	Ross 18-1 Bendix Hyd.	Bendix Hyd.
Steering	42 in.	56 1/4 in.	54 1/2 in.
Brakes	42 in.	56 1/4 in.	54 1/2 in.
Front Spring Length	56 1/4 in.	56 1/4 in.	54 1/2 in.
Rear Spring Length	56 1/4 in.	56 1/4 in.	54 1/2 in.

Increased Electrolyte Viscosity Cuts Capacity of Cold Batteries

It is generally known that the capacity of storage batteries decreases at low temperatures, but is not so widely known that this decrease in capacity is due to the increase in the viscosity of the electrolyte at low temperatures. The viscosity affects the rate of diffusion of the electrolyte through the porous material of the plates and through the separators. Since storage batteries are now being used under widely varying temperature conditions, G. W. Vinal and D. N. Craig have investigated

the viscosity of sulfuric acid solutions of from 10 to 50 per cent over the temperature range + 30 deg. to -50 deg. C., except as the measurements were limited by freezing points.

The viscosity of these solutions at 0 deg. C is about two and one-half times as great as at 30 deg. C., but at -50 deg. C. the viscosity is 28 times as great. The research work is described and the results are given in detail in Research Paper RP 566 of the Bureau of Standards, of which copies can be obtained from the Superintendent of Documents, Washington, D. C., at 5 cents each.

Streamlines

Streamlining seems to have provided publicity men with plenty of ammunition. But in practice it has been a little difficult to approach their claims so far as the product is concerned. Of what avail is streamlining if tires are mounted in front fender wells or when the rear spare is completely exposed in the slip stream. Also what can be said of the trunk mounting unless it can be faired in with the slope of the back panel. On the other hand these may not be hard to incorporate in current design.

"Airflow" Chryslers Offered with Overdrive Transmissions

Six has independent front wheel suspension and more conventional body styles—All models are more powerful and all have longer wheelbases except Custom Imperial.

IN the 1934 Chrysler line there are represented both of the methods by which the Chrysler Corporation has designed markedly improved riding qualities into its products. The improved six in 118- and 121-in. wheelbase lengths has independent front-wheel springing similar to that offered in the Dodge and Plymouth lines, while the three eights all have the new "Airflow" bodies associated with a new weight distribution and wide, three-passenger front seats. The bodies on the six follow more conventional lines.

The eights also are offered with an overdrive engaged through an automatic clutch, this feature being standard equipment on the Imperial and Custom Imperial and optional at extra cost on the Royal.

All engines are considerably more powerful and, with the ex-

ception of the Custom Imperial, are of larger piston displacement. Wheelbases also have been increased on all models except the Custom Imperial.

The major sales effort, apparently, will be devoted to the new eights, particularly the Royal Eight and the Imperial Eight. Bodies and chassis are essentially enlarged versions of the new De Soto line announced in last week's issue of *Automotive Industries*. For the theory behind the new weight distribution resulting from placing the engine over the front axle the reader is referred to that issue. It may be briefly recalled, however, that by increasing the weight on the front springs and at the same time making these springs softer, the vertical acceleration of these cars on rough roads is materially reduced, while

pitching is said to have been eliminated entirely. The result is described as a "floating ride."

Moving the engine ahead over the front axle made it possible to shift the entire body forward about 20 in., bringing the rear seat ahead of the rear axle, with further improvement in the rear-seat ride.

Chassis frames are much lighter than usual—the bodies themselves acting as the frame for the car. This is achieved by incorporating in the bodies a system of triangular trussing extending from rear bumper to front bumper, and eliminating the usual unbraced weak point ahead of the dash.

For increased strength, the body side panels are carried up higher than usual, with the window ledges at shoulder height for the average person. In combination with the high hood on these cars this works out well from an appearance standpoint.

Bodies are tunneled for propeller shaft clearance, permitting a low over-all height. Owing to the unusual width of the front ends, the windshields are of more than normal width, in two sections, and Vee-shaped. Rear windows also are in two sections.

Fenders are narrow, and there are no valleys between front fenders and hood. As a matter of fact, there is no conventional hood. The engine enclosure, or the nose of the car, is fixed in position, access to the top of the engine being through an opening in the top of the nose closed by a cover hinged at the rear, while access is gained to the side of the engine by removing a front wheel and wheel-housing panel.

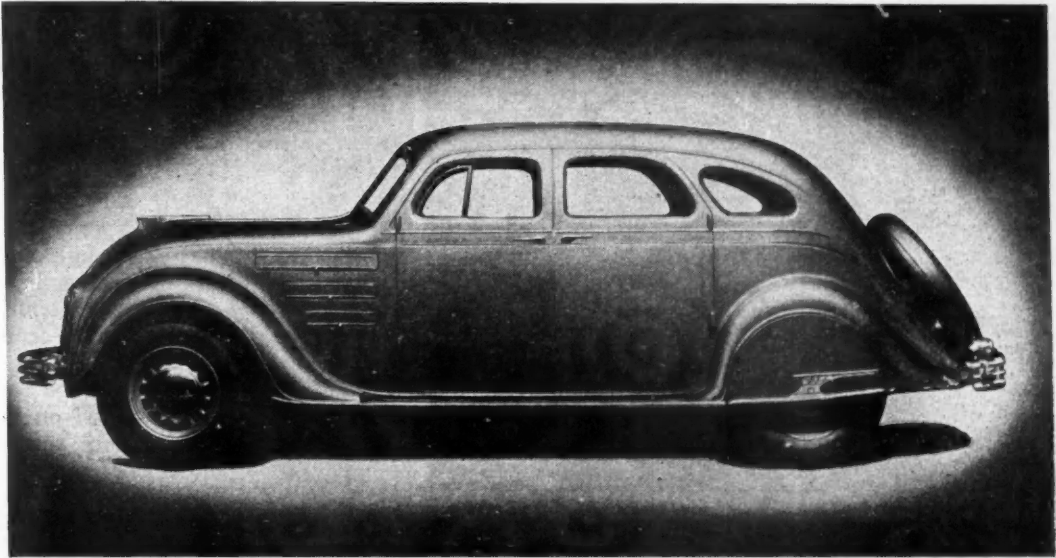
Headlamps are sunk into the



Three-quarter front view of Chrysler Airflow sedan

by Athel F.
Denham

Field Editor,
Automotive Industries



Side view of Chrysler eight-cyl-
inder "Airflow" sedan

rounded front end, with parking lamps directly below the main lenses. Distinctive three-bar bumpers are carried in front and rear. There are three horizontal louver doors for ventilation of the engine compartment.

Cover plates at the rear fenders inclosing the entire top of the wheel are standard equipment. Back of the rear seat there is a large luggage compartment accessible by lifting the rear seat-back by a pull strap, the seat-back being hinged at the top. In coupe models, spare wheels are concealed within the rear deck, which slopes even more than the rear deck of the sedan types.

The Chrysler overdrive which is standard on Imperial and Custom-Imperial and optional on the Royal, is of the planetary type and operates automatically in combination with the free-wheeling unit. With the dash control in the free-wheeling position, when the car reaches a speed of 40 to 45 m.p.h., the overdrive engages when the throttle is momentarily closed. The engage-

ment is mechanical, being effected by a number of centrifugal pawls which engage when the engine has dropped to the speed corresponding to the momentary car speed through the overdrive. As the engagement is completed the free-wheeling unit is automatically locked out.

With free-wheeling locked out by the dash control, the overdrive cannot engage. Return to direct drive is effected automatically when the speed of the car drops to 40 m.p.h. and the torque is relieved (throttle closed). For passing cars at speeds above 50 m.p.h. when in overdrive, the driver shifts into second, which gives about the same over-all ratio as the direct drive without overgear; or he locks out the free-wheeling unit by means of the dash control, which locks the overdrive unit, giving direct drive.

The engine in the Royal Eight now develops 116 hp., against 90 hp. last year, the increase being due to the use of a higher com-

pression ratio made possible by an aluminum head; an increase in valve lift, a new camshaft with "high-speed" timing, and an increase in the displacement from 273.8 to 298.6 cu. in. effected by lengthening the stroke from 4 1/8 to 4 1/2 in.

Connecting rods are now of high-manganese instead of carbon steel. Main bearings are of the steel-back, thin-shell type, permitting of an increase in crankshaft diameter. T-slot pistons carry plain 1/8-in. compression rings instead of the Tungtite rings formerly used. The oil ring is wider. Increased valve lift (11/32 in.) required the use of higher valve spring pressures. Exhaust valve seats are of the alloy-insert type.

Generators now are provided with a voltage-limit relay, to permit higher charging rates at high car speeds. Batteries have been increased in size, now having a rating of 140 amp.-hrs.

The cooling system layout on the three eights is novel. Water from

Comparative Specifications on the Chrysler Line

	Six		Royal Eight		Imperial Eight		Custom Imperial Eight	
	1934	1933	1934	1933	1934	1933	1934	1933
Wheelbase	{ 121 in. 118 in.	117 in.	123 in.	120 in.	130 in.	126 in.	146 in.	146 in.
Tires	6.50/16	5.50/17	7.00/16	6.00/17	7.50/16	6.50/17	7.50/17	7.50/17
Rear axle ratio	4.11	4.375	4.10	{ 4.30 4.75	4.3	4.30	{ 3.86 4.14	{ 3.82 4.10
Cylinder bore	3 3/4 in.	3 3/4 in.	3 3/4 in.	3 3/4 in.	3 3/4 in.	3 3/4 in.	3 3/4 in.	3 3/4 in.
Stroke	4 1/2 in.	4 1/2 in.	4 1/2 in.	4 1/2 in.	4 1/2 in.	4 1/2 in.	5 in.	5 in.
Piston displacement	241.5 cu. in.	224 cu. in.	298.6 cu. in.	273.8 cu. in.	323.5 cu. in.	298.6 cu. in.	384.8 cu. in.	384.8 cu. in.
Standard compression ratio	5.4	5.35	.....	5.4	6.5	6.2	6.5	5.8
Maximum output	93 @ 3400	83 @ 3400	116 @ 3400	90 @ 3400	128 @ 3400	108 @ 2400	145 @ 3200	135 @ 3200
Transmission	3-speed	3-speed	Overdrive*	3-speed	Overdrive	3-speed	Overdrive	4-speed
Rear axle	Bevel	Bevel	Bevel	Bevel	Bevel	Bevel	Worm	Bevel
Front spring length	Independent coil	35 1/2 in.	44 in.	35 1/2 in.	44 in.	38 1/4 in.	40 in.	39 1/2 in.
Rear spring length	.....	53 3/8 in.	52 1/2 in.	53 3/8 in.	53 3/8 in.	54 3/8 in.	60 in.	57 1/2 in.

* At extra cost.



The new seats with a frame of chromium plated tubing

the block feeds into a small header tank at the top of the cellular radiator, this header tank being connected with a separate supply tank located on a body panel near the engine. The overflow is located in this supply tank. There is also an air bleed between the radiator and the supply tank. Cooling water is by-passed by a thermostat at low engine temperatures. Fans are larger in diameter and are mounted directly on the crankshaft.

The Imperial Eight, which last year carried an engine of the same size as this year's Royal Eight, now has a new and larger engine, $3\frac{1}{4}$ by $4\frac{7}{8}$ in. With a standard aluminum (bohnalite) head of 6.5 to one ratio it is said to develop 128 hp. at 3400 r.p.m. for its 323.5 cu. in. displacement.

Cylinder dimensions of the engine in the Airflow Custom Imperial are the same as last year ($3\frac{1}{2}$ by 5 in.). Engine accessories on all three lines include an improved automatic choke, automatic manifold heat control, and a co-incidental starter operated through the accelerator pedal.

Knife-edge fulcrums have been provided in the clutch-release mechanism, for easier pedal operation. Automatic clutch control is retained, as is free-wheeling. All gears in the transmissions are of the quiet helical type.

Propeller shafts, which, owing to the rearrangement of chassis units, are longer than formerly, are made larger in diameter, to prevent whip. Needle-bearing universals are retained.

On both the Chrysler Eight and the Imperial Eight the rear-axle ratio is now 4.10 to 1. The tread at the rear axle is less than last year. This is conducive to better streamlining and is permissible because the wheel housings no

longer control the rear-seat width.

Front axles are entirely new and have tubular centers. Steering-knuckle bearings are materially increased in size. Steering-gear ratios were stepped up, and the efficiency of the gears was increased by the use of more anti-friction bearings. These changes in the steering mechanism were made to compensate for the effects of increased contact area between tires and road and the increased load on the front wheels. Steering gears are located on the chassis well ahead of the front axle, so that the steering columns have more rake than formerly.

Drums of parking brakes are smaller in diameter but wider. Service-brake drums also are somewhat smaller in diameter, on account of the smaller wheels.

Front springs are $8\frac{1}{2}$ in. longer than on last year's eights, which with the increased weight on the springs makes for much softer springing at the front end. Rear springs, which now carry less weight, have been shortened slightly.

Steel-spoke 16-in. wheels are standard equipment on both the Chrysler Airflow Eight and the Airflow Imperial Eight. The former has 7.00-in. and the latter 7.50-in. tires.

Chrysler Eights are to be produced in four body types: The six-passenger, four-door sedan, six-passenger, two-door, brougham, six-passenger town sedan, and five-passenger coupe with folding auxiliary seats for two inside the body.

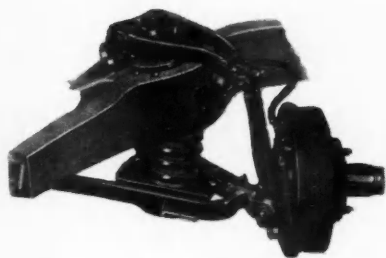
All models carry ventilating-type front-door windows, in two sections. The front swinging wing, together with the dividing center post, may be lowered with the rear half, if desired.

Seats have frames of chromium-plated tubing. Seat cushions are raised off the floor, permitting air circulation from the front to the rear compartment under as well as over the seat, resulting in better rear-compartment heating in winter, and better cooling in summer. Front seats in the coupe and brougham models are of the cross-seat type, but have divided backs which can be folded forward for easier access to the rear than afforded by the doors alone.

Glove compartments are provided on both sides of the instrument panel. Interior headlining is of a hard-finish designed to be washable.

Modifications in Chrysler Six Specifications

	1934	1933
Brakes, parking		
drum diam.	6 in.	7 in.
Drum material ..	Cast iron	Pressed stl.
Brakes, service		
lining width	2 in.	$1\frac{1}{2}$ in.
Lining area	177.3	113.6
Car overall length	192 $\frac{3}{4}$ -194 $\frac{1}{4}$	189 $\frac{1}{4}$
Clutch release ...	Knife edge	Plain
Cooling control ..	By-pass	
	thermostat	Thermostat
Camshaft material	Cast iron	Forged
Chain width	1 in.	$1\frac{1}{4}$ in.
Choke control ...	Automatic	Manual
Crankpin diam. ...	$2\frac{1}{4}$	1 15/16
Length	$1\frac{1}{4}$	1 $\frac{1}{8}$
Crankshaft diam. ..	$2\frac{1}{2}$	$2\frac{1}{4}$
No. counterweights	7	4
Compression		
rings, No.	3	4
Width	$\frac{3}{4}$	9/64
Oil ring width....	3/16	....
Valves, port, diam.		
intake	1 5/16	1 $\frac{1}{8}$
Exhaust	$1\frac{1}{4}$	1 5/16
Valve lift	11/32	5/16
Valve spring pressure, valve open	107 lbs.	78 lbs.
Valve closed	48	42
Intake opens	TDC	6 deg. ATC
Intake closes	50 deg. ABC	46 deg. ABC
Exhaust opens ...	48 deg. BBC	42 deg. BBC
Exhaust closes ...	2 deg. ATC	8 deg. ATC
Battery capacity .	121 amp. hr.	100 amp. hrs.
Generator charge control	Voltage limit	Third brush
Starter control ..	Solenoid	Coincidental
Frame stock		
thickness	7/64	$\frac{1}{4}$
Side rail depth....	6 in.	5 in.
Kick-up front ...	2 13/32	2 27/32
Kick-up rear	5 13/16	6 11/32
Muffler, type	Reverse flow	Through type
Shock absorbers, front	Inertia hydraulic	Double acting hydraulic
Rear	Inertia hydraulic	Single acting hydraulic
Springs, front	Coil	Semi-elliptic
Steering gear, type	Worm and roller	Worm & wheel
Ratio	18.2	15 to 1
Transmission		
ratio, second ...	1.55	1.49 to 1
Low	2.81	2.59
Reverse	3.61	3.24
Lubricant cap. ...	2 $\frac{3}{4}$ pts.	3 $\frac{3}{4}$ pts.
Std. wheels	Steel spoke	Dem. wood
Diameter	16 in.	17 in.
Rim width	4.50	3.25
Tire section	6.50/16	5.50/17



Independent front suspension is used on the Six

Available in two wheelbases, the Chrysler Six for 1934 not only has independent front-wheel springing with soft coil springs, but also is more powerful than last year's car. The 121-in.-wheelbase chassis carries a close-coupled sedan and a convertible sedan, both with decidedly sloping rear body panels—providing, as in the Airflow models, a large luggage compartment back of the rear seat.

Horsepower has been raised by an increase in the bore from $3\frac{1}{4}$ in. to $3\frac{3}{8}$ in. New engine details

include a cast-iron camshaft; removable connecting-rod liners; thin-shell main bearings; a crankshaft of larger diameter; a valve timing better suited to high speeds; an automatic choke; automatic manifold heat control, and a by-pass with thermostatic control in the cooling system.

Brake drums are reported to be of the new Budd type, cast iron with cast-in steel backing plate, the drum being provided with multiple fins for cooling. They are wider than formerly.

Knife-edge fulcrums have been added to the clutch release for softer pedal action. Automatic clutch control is available, incorporating a new "wear-compensating" spring in the piston-rod assembly. Transmissions remain of the quiet-in-all-speeds helical-gear type. Freewheeling remains standard equipment.

The independent front-wheel suspension is similar in principle to that used on the Plymouth, which was illustrated and de-



Showing how luggage is stowed in rear deck compartment in Royal and Imperial Eights

scribed in detail in the December 16 issue of *Automotive Industries*. Rubber bumpers are placed inside the coil springs, and the principle of cross steering is applied in this car also.

Industry Offers a Better Ride

(Continued from page 777)

car is now regularly being fitted with a centrifugal supercharger which increases the engine output by more than 40 per cent.

While automatic transmissions have been on the horizon for a number of years, transmission practice remains in the status quo for the time being, the most important change being that the use of helical gears throughout becomes almost standard. Reo's change to the transmission with automatic shift has found no emulators so far, though Chrysler has come out with an overdrive which is engaged automatically, through control of the throttle valve. A great amount of interest in transmission development was engendered by the successful application of synchronizing devices and by the introduction of such aids to gear shifting as the free-wheeling unit and the automatic clutch, and numerous automatic and semi-automatic transmissions have been developed, but manufacturers evidently either hold the opinion that the advantages offered are not worth the extra cost, or else that these devices are not quite ripe for production.

More cars are equipped with power brakes than in the past. De-

cided efforts have been made, moreover, to render the control operations, including steering, clutch control and brake application, easier for the operator. A number of additional cars carry low-pressure tires, and the efforts to ease the steering are at least in part intended to offset the unfavorable effect of greater tire tread widths on steering effort required.

The increased load placed on electric generating plants by constant increase in the number of electric consuming devices has at last prompted engineers to do something to protect the batteries. Up to recently the third-brush system of output control was practically standard on passenger-car motors.

One method of increasing the charging rate as the battery nears exhaustion consists in using voltage control. As the charge in the battery becomes depleted its voltage decreases, and with constant voltage at the generator terminals, the difference between generator and battery voltage, to which the charging current is proportional, increases. Another method of safeguarding the battery consists in providing current control, which tends to keep the charging current

constant regardless of changes in engine (and generator) speed, but provides for an increase in generator output when lamps are turned on. There is, of course, a certain economy in supplying the lighting current directly from the generator, instead of through the intermediary of the battery, and, in addition, the charging rate in that case can be made much smaller, which reduces the likelihood of overcharging.

While the practice of offering both a standard line and a line with extra equipment on the same chassis is far from being new, it has gained additional adherents during the past year. In most cases the lowest-priced line is the best selling one and has the greatest amount of selling effort devoted to it, the other being known as a deluxe line.

More detail improvements seem to have been made this year than for several years. Among the more important ones are the wider use of aluminum heads with higher compression ratios, stiffer frames, more body room, increased use of hydraulic brakes, improvements in piston design, and better spare tire mountings.

Dodges Are Bigger and More

Independent front wheel suspension, body ventilation, stiffer frames, new radiator design are among their selling points

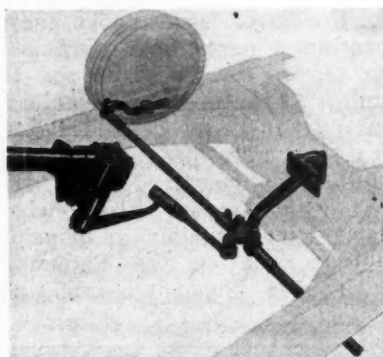
DODGE Six cars for 1934 are larger, being offered in two lengths of wheelbase of 117 and 121 in., and they embody such improvements as independent wheel suspension with split tie rod, increased power, a new body-ventilating system and new front-end appearance. The eight-cylinder model has been dropped, apparently.

On the 117-in. chassis are offered a four-door sedan, a coupe with or without rumble seat, and a convertible coupe. The 121-in. chassis carries a brougham and a convertible sedan. The 121-in. wheelbase models are characterized by increased slope of the windshield and rear body panels.

As may be seen from the illustrations, new body features include a Vee-shaped sloping radiator grille, deeper than formerly; three groups of horizontal louvers, each of different length, and a new hood design. Wheels are now of the steel-spoke type and carry low-pressure tires of larger section (6.25 in.) on wider rims, to allow for the greater weight of the cars.

Engine horsepower has been increased by increasing the bore $\frac{1}{8}$ in. and by raising the compression ratio. A Bohnalite aluminum head, which is being offered as extra equipment, adds another 5 hp.

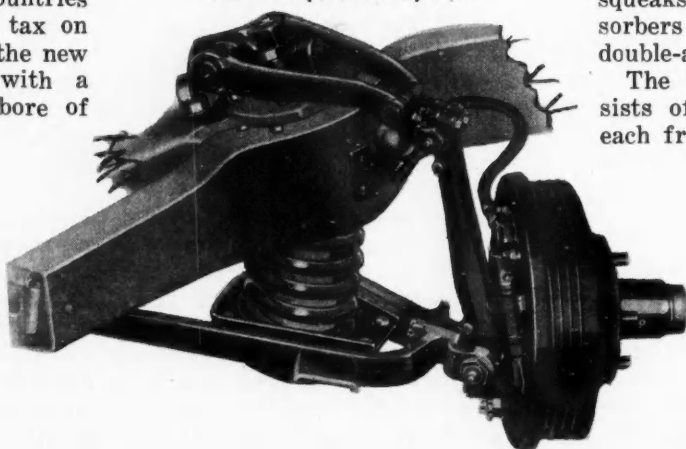
For export shipment to countries which levy a high annual tax on the basis of cylinder bore, the new Dodge Six is available with a smaller engine having a bore of $2\frac{7}{8}$ (instead of $3\frac{1}{4}$) in.



Layout of the cross steering, with a separate link to each knuckle

The Dodge Brothers front-wheel suspension system, which is being merchandised under the term "floating cushion wheels," is of the short-link parallelogram type. In general design it bears a close resemblance to that of the Plymouth. The steering knuckle is carried on a steering head which is connected by two wishbone links to top and bottom of the frame front cross member. The top link is shorter

Detail view showing the front suspension system



than the lower one, so that spring deflections will produce no change in wheel tread, permitting a slight operating variation in camber.

The hinge of the lower wishbone to the frame and the two hinges at the steering head have threaded-bolt-and-bushing-type bearings. The need for separate bearings for the upper wishbone at the frame is obviated by clamping the two arms to the shock-absorber shaft. Coil springs are located between the lower wishbone and the frame, and these springs are quite soft.

Provision for making caster adjustments during the assembling process is made in the upper hinge bolt at the steering head. Turning this bolt increases or decreases the caster angle for the corresponding kingpin. Adjustment in service can be made in the same way, of course, but should rarely be required.

Conventional Dodge suspension is retained at the rear, but the springs are longer and wider, with fewer leaves. The semi-elliptics are carried in rubber bushings at the front and threaded silent-U shackles at the rear. Oilite inserts are located between the ends of the three upper leaves as formerly, to reduce static friction and prevent squeaks. Single-acting shock absorbers are used at the rear, double-acting at the front.

The steering arrangement consists of individual tie rods from each front wheel connecting to an

Powerful for 1934

intermediate steering arm, swivel mounted on the frame front cross-member on anti-friction bearings. To this intermediate arm is connected the drag link which runs at right angles to the frame (cross-steering) and connects to the pitman arm of the steering gear, mounted well forward on the frame, as was the case in 1933 Dodge cars.

Frames are considerably more rigid than formerly, due particularly to the new front crossmember construction. Side rails, of box section, are 1 in. deeper than formerly, while the front kick-up has been reduced with the adoption of independent springing.

To increase the life of main bearings and crankshaft rigidity, main-bearing diameters have been increased $\frac{1}{4}$ in. and the number of counterweights has been increased from five to seven. Crankpins are slightly narrower than formerly, and, as last year, carry removable liners at the lower end.

Cast-iron camshafts with integral cams and distributor drive gears have been adopted. Valve stems are slightly longer than formerly, reducing the valve-spring pressure with the valves closed.

The bore of the engine is now $3\frac{1}{4}$ in., which with a stroke of $4\frac{3}{8}$ in. gives a piston displacement of 217.8 cu. in. With the standard 5.6 to 1 head the engine is said to develop 82 hp. and with the aluminum head 87 hp. at 3600 r.p.m. Radiator cores are thicker than formerly, for better cooling. Mufflers are larger in diameter and shorter, to reduce back-pressure.

Clutches are of the 10-in. single-plate type, an inch longer, and have a knife-edge type of fulcrum for the release fingers at the clutch plate. The lining is thicker on the pressure-plate side, to compensate

for wear. Bendix automatic clutch operation, including a wear compensator in the piston-rod assembly, is optional at extra cost. Freewheeling is standard.

Transmissions—as was the case last year—are of the all-helical-gear variety. Cageless roller bearings are retained for universals. The final drive ratio is 4.37 to 1 for sedans and 4.11 to 1 for coupes. Batteries are increased in capacity and now are of the 15-plate type. The charging rate has been increased and voltage regulation adopted to avoid overcharging. Parking brakes now also have cast-iron drums, while those of the service brakes, which are cast integral with the steel backing plate, are finned for better cooling, and are wider than formerly. Although the length of lining per brake is reduced to $15\frac{3}{4}$ in., the frictional area is increased some 20 sq. in., owing to the increased width.

Quite a number of refinements have been made in the bodies. Windshields are now opened and closed through a concave steel tape, winding and unwinding on a reel, crank-operated, giving noiseless and rattle-proof action. Front-door windows have built-in venti-

lating wings which can be either lowered together with the rear half of the window or can be opened out as wings. The dividing center post moves with the window when both halves are lowered together.

In the rear-quarter windows of sedans and coupes there are crank-operated, full-ventilating wings. Cowl ventilators are now larger.

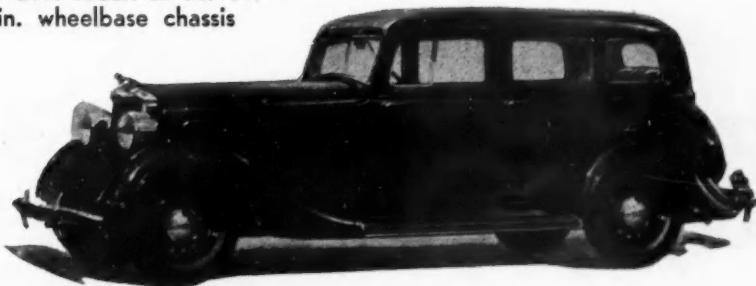
Control of idling speed is now through the choke valve instead of through a thermostat.

Rear-seat back cushions are hinged at the top and provided with pull straps at the bottom, so that

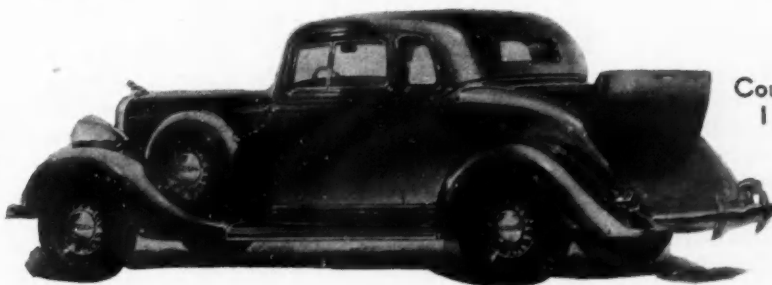
How luggage can be carried in the rear deck of sedan models



Four-door sedan on the 117-in. wheelbase chassis

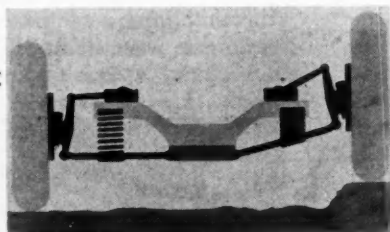


Coupe with rumble seat on 117-in. wheelbase chassis

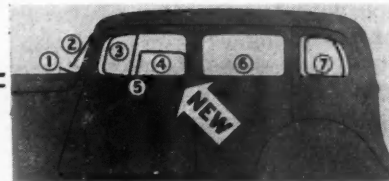


Dodge Specification Revisions

	1934	1933		1934	1933
Axle ratio	4.375	4.375 & 4.11	Camshaft type	cast iron	forged
Wheelbase	117 & 121	115	Carburetor		
Service brake drums ...	cast iron	centrifuse	Idle adjustment	dash	automatic
Parking brake drums ..	cast iron	steel	Crankpin width	1 in.	1 1/4 in.
Service brakes			Counterweights	7	5
Lining/wheel	15-25/32	18-5/16	Crankshaft diam.	2 1/2	2 1/4 in.
Width/lining	2 in.	1 1/2 in.	Bearing area	40.62	36.56 sq. in.
Contact area	126	107	Spring press. valve closed	34-38	43-47 lbs.
Clutch diam.	10 in.	9 in.	Battery, plates	15	13
Facing OD	9 7/8	9 in.	Capacity	90	86 amp. hrs.
Facing ID	6 1/4	5 3/4	Generator control	voltage limit	third brush
Thickness .....	.125 & .133	.125	Frame depth	6 in.	5 in.
Radiator			Rear springs		
Core thickness	3 1/2	2 3/4	Length	53 3/4	52 1/2
Capacity		14 1/2 qts.	Width	1 3/4	1 1/2
Engine			Leaves (sedan)	8	9
Bore	3 1/4	3 1/8	Tires	6.25/16	6.00/16
Rated hp.	25.35	23.4	Rim width	4.25	4.00
Displacement	217.8	201.3 cu. in.	Std. wheels	steel spoke	demountable wood
Standard compress. ...	5.6	5.5			
Max. hp.	82-3600	75-3600			
Alumin. head ratio ...	6.5	none			
Max. hp.	87-3600	none			
Oil pressure	50 lbs.	40 lbs.			



Diagrammatic drawing of independent suspension system



Details of the so-called 7-point ventilating system

they can be swung out to give access to a luggage and tool compartment back of the rear seat, this compartment being formed by the slope of the rear body panel.

Interior equipment includes carpeted foot rests, robe cords and ash receivers in the rear as well as at the center of the instrument panel. The ash receivers in the

panel can be removed to make room for the installation of the control unit for radio. All cars are wired for radio, which facilitates the installation of a receiving set.

Bower and Davidson Tell Inside Story of G. M.'s "Knee" Wheels

NEWs behind the news was brought out by W. J. Davidson of General Motors in presenting a paper, "Knee-action Wheels and Other G. M. Developments for 1934," which was prepared jointly by the speaker and F. A. Bower, chief engineer of Buick. The talk, given before "Met" Section S.A.E. on Dec. 21, was enlivened by an interesting film showing the behavior of the

new Buick on the road, also a demonstration of independent wheel action when running on the ties over a stretch of railroad track.

The human interest in this paper lies in the fact that it is more concerned with the problems behind the program than with a description of the new job. We discover for example that the 1934 Buick suspension is an outgrowth of a design investigated by Cadillac for

some time. Several other types were considered including the split axle type, but the designs finally adopted by General Motors were decided upon because it was felt that they gave better steering control with front springs having low rates.

Perhaps the biggest change occasioned by the use of knee-action wheels was the development of an entirely new tire with a special

tread pattern to meet the new requirements. Four tire makers cooperated in building a large doughnut tire with inflation pressures ranging from 21 to 25 lb. When hot, the pressure is to be held about 3 lb. higher.

Experimentation with tread designs showed something had to be done to improve steering and eliminate squealing on turns. It was found that the corners of the tread must be rounded and the side wall ribbing radial rather than at an angle. Side wall construction had to be changed radically as the angle of the fabric layers was found to have considerable effect on car wander.

With tire designs incorporating these principles, it was found that tires not only were very quiet on turns and straightaway driving but the wear was equally distributed across the face of the tread with no indication of cupping. Wear tests over many thousands of miles of service indicated that the life of these tires is as good or better than that of the old higher pressure tires.

Mr. Davidson brought out a number of points which should be of great interest not only to engineers but also to those concerned with servicing the new cars. First, at least in the Buick design, it is found that independent wheel suspension is very sensitive to friction or looseness in the front-end joints and elements. Friction is minimized in the steering gear, the new gear being redesigned for better efficiency, equipped with anti-friction bearings throughout and steering ratios increased.

The intermediate arm or bell crank which connects with the individual tie-rods was found to be carrying a considerable load and had to be fitted with an adequate roller bearing. Proper steering control depends largely upon the precision of mounting, freedom from friction, and absence of backlash.

Steering gear lash has to be as close to zero as possible and must be so maintained in service.

Knee-action brought out some new frame problems, the frame now being required to carry loads heretofore handled by the front axle. The front was made extremely rigid but when this was done, the weaving effect simply traveled along until it found another weak spot further back. On the Buick this was just back of the dash line, causing a bad body shake. To elim-

inate this effect, the frame was reinforced by fitting braces between the ends of the X-frame members and the side rails.

While the 1933 Buicks employed the conventional spring rates of approximately 300 lb. per in. at the front and 150 lb. per in. at the rear, the 1934 models have a spring rate of 150 lb. per in. both front and rear. This necessitated a marked change in shock absorber specifications.

On the Buick, the regular double acting shock absorbers produce a harsh acting front end. Consequently, the car now is equipped with inertia shock absorbers in front and double acting shocks without inertia control for the rear. Front shock absorber calibration is very critical and sensitive to adjustment since there is twice as much spring action as before. Accordingly it is found necessary to keep the oil constantly at a given level and maintained there throughout the life of the car. In the manufacture of the units care must be taken to keep them free from dirt, as dirt under any of the valves upsets the calibration and has a pronounced detrimental effect on riding quality.

The system is found to be sensitive to caster angle adjustment. However, a simple adjustment is provided to take care of production variations and it is claimed that this need not be touched in service unless the mechanism is damaged through accident.

Experiment has shown that the very minimum clearance must be maintained in the various connections particularly at the hinge points at the ends of the steering knuckle support. Although these bearings seem to show little wear, looseness is not to be tolerated since it tends to produce uneasiness in steering.

The authors of the paper believe that independent spring suspension is needed only in front since the primary advantage of the construction is to permit a satisfactory means of reducing front spring rates. The rear springs already being low in rate would not be benefited by the new construction.

On the Buick the weight has been redistributed so as to be nearly equal on front and rear wheels. To compensate for the additional weight transfer when braking at high speed, braking power also has been redistributed.

Buick's experience to date with the coil springs indicates that they

have an extremely long life. During the entire development program only three springs were broken and those breakages were traceable to surface flaws in the experimental material. To prevent surface flaws all stock is purchased centerless ground to a fine finish. After coiling the spring is quenched in a semi-automatic machine which holds the spring to the correct height and keeps it square.

Manufacture of the coil springs brings up some rather ticklish problems due to the necessity for holding very close specifications. The rate has to be accurate, the metal free from surface defects, height held within close limits and bearing surfaces have to be square with the center line of the spring. It is said by the authors that no commercial spring maker was willing to work to these requirements and consequently Buick has had to tackle the job themselves.

The weight of the coil spring is less than one-half that of an equivalent leaf spring. By properly proportioning the ratio of spring diameter to wire diameter, the working stresses are well within the limits of commercial alloy steel despite the magnitude of the loading and the relatively large deflection.

Tramp at high speeds was encountered in the experimental runs but at no time was it extreme in action. In all cases it was eliminated by getting the wheel and tire assemblies in static balance.

The New Plymouth

(Continued from page 780)

type. Deluxe models have onyx-type knobs on all controls. A foot-dimmer switch is also provided on these models.

An exterior feature offered at extra cost is a tire cover which encloses the entire wheel and tire. A 'backing plate' for the wheel and tire is then added to the wheel mounting. A locking-type hub cap locks the cover onto the wheel and the wheel onto the carrier. Provision is made so the spare tire can be inflated without removing the cover.

New bumpers have been adopted. On the Deluxe they have double bars in the center section.

For export to countries where high taxes are based on the cylinder bore, engines with a bore of 2 $\frac{7}{8}$ -in. (instead of 3 $\frac{1}{8}$ -in.) are available on both the Plymouth Six and the Deluxe Plymouth.

O.K'd. Jobber Code Covers Wholesaling by Manufacturers of Parts and Equipment

Resale Price Maintenance in Abeyance Pending Investigation to Substantiate Alleged Unfair and Discriminatory Practices—Bars Sales Below Costs Determined by Uniform Accounting Plan

WASHINGTON — Comprehensive regulation of the wholesale distribution of automotive merchandise, including such distribution by car, equipment and parts manufacturers, is provided by the code of fair competition for the wholesale automotive trade approved by President Roosevelt Dec. 18 and which went into effect Dec. 28.

The code does not authorize resale price maintenance but directs that an investigation be completed within 90 days into alleged unfair and discriminatory practices. If this investigation substantiates the allegations, resale price maintenance provisions become legal on the order of NRA.

The "wholesale automotive trade" is defined as "the selling of automotive merchandise to retailers by any person whether such person purchases or manufactures such merchandise. The term shall likewise include the machining or secondary processing of automotive merchandise, such as cylinder reboring, piston grinding, piston pin fitting, or the reconditioning, repairing, or installing of any component part or unit of equipment by one who sells as aforesaid."

The term automotive merchandise is defined "to include any and all parts, equipment, tools, accessories, and supplies used in the repair and maintenance of motor vehicles (meaning automobiles, including passenger cars, trucks, truck tractors, buses, taxicabs, hearses, ambulances, and other commercial vehicles for use on the highway, excluding motorcycles, fire apparatus, and tractors other than truck tractors), stationary, internal combustion engines and aeronautical and marine engines, excepting tire and petroleum products and such other products related to the motor vehicle industry as may be specifically covered by any code applying to the wholesale distribution thereof duly approved by the President."

The code calls for the formulation of a uniform classification of accounts and on approval thereof by NRA, all members must use it. Sales below cost as determined by uniform accounting are barred, except that this provision does not bar exchanges between members of the trade nor does it apply when manufacturers' resale schedules are less than the cost indicated by uniform accounting.

Regarding resale price maintenance, the Code Authority is directed to name a representative who will work with representatives of the N.A.C.C., the A.P.E.M. and the N.A.D.A. to investigate alleged unfair and discriminatory practices. The chairman of the committee may be appointed by NRA Administrator Johnson. This committee must report within 90 days and if NRA finds that unfair and discriminatory practices do exist, the following provisions become effective:

"The sale by any member of the Trade of any branded or trademarked merchandise at a price lower or on terms more favorable than the prices and terms in the currently published suggested resale

schedules of the manufacturer thereof, is an unfair method of competition.

"The sale by any member of the Trade of any article of automotive merchandise known to the Trade to be identical with and to be manufactured by the manufacturer of some branded or trademarked article at a price lower or on terms more favorable than the prices and terms in the currently published suggested resale schedules of said manufacturer for said branded or trademarked article, is an unfair method of competition."

"The sale by any member of the Trade of any article of automotive merchandise in such manner as to indicate to the purchaser thereof that such article is identical with and manufactured by the manufacturer of some branded or trademarked article at a price lower or on terms more favorable than the prices and terms in the currently published suggested resale schedules of said manufacturer for said branded or trademarked article, is an unfair method of competition."

(Turn to page 802, please)

Supercharger on Graham Custom 8

DETROIT—A supercharger, increasing the power of the Graham eight-cylinder engine from 95 to 135 horsepower, features the Graham custom eight which is to be displayed for the first time next Saturday, Jan. 6, at the New York Automobile Show, J. B. Graham, president of the Graham-Paige Motors Corporation, announced today.

Buick 1934 Prices Commence at \$1,045

FLINT—Prices on the Buick line for 1934 range from a low \$1,045 to a high of \$2,055 as compared with last year's price range of \$995 to \$2,055. The four-door sedan on the 50 is up \$80, on the 60 the increase amounts to \$35 while on the 90 the rise is \$30. The new price schedule follows:

Series 50		
Business coupe	\$1,045	\$985
Sport coupe	1,080	1,030
5-pass. vict. coupe	1,095	1,065
4-door sedan	1,125	1,045
Convertible coupe	1,165	1,115
Series 60		
Sport coupe	1,300	1,270
5-pass. vict. coupe	1,315	1,310
4-door sedan	1,345	1,310
Club sedan	1,365	....
Conv. coupe	1,395	1,365
5-pass. conv. phaeton	1,575	1,585
Series 90		
Sport coupe	1,745	....
5-pass. vict. coupe	1,795	1,785
Conv. coupe	1,845	....
4-door sedan	1,845	1,805
Club sedan	1,865	1,820
7-pass. sedan	1,955	1,955
5-pass. conv. phaeton	2,045	....
7-pass. sedan limousine	2,055	2,055

NE

Accord Reported on Fleet Discount Plan

Only Operators Buying More Than \$15,000 Annually to Be Eligible

DETROIT—A plan for handling fleet sales under the dealer code is reported here to have been formulated by manufacturers and dealers. Although both confirmation and details of the plan are lacking, it is understood that it contemplates that only fleet owners purchasing a minimum of \$15,000 annually from a factory will be eligible for consideration as a national account.

Under the plan fleet operators, it is said, will buy cars in the same manner as retail customers but will receive some sort of certificate of purchase. This certificate they will forward to the factory which will rebate them at the reported rate of three per cent from list. The factory will collect the rebate from the dealer.

As to parts discounts, the tendency among local code administrations seems to be to classify fleet owner repair shops as established service stations and to grant them discounts on parts actually installed in such shops. This means in the event of a breakdown on the road necessitating the use of a convenient service station, parts required do not carry a discount to the fleet owner.

Federal Brings Out Three Bus Chassis

DETROIT—Three new chassis, designed for motor bus service and also adapted for commercial haulage where an unusually low body mounting is desired, have been put into production by the Federal Motor Truck Co., M. L. Pulcher, president, announces. These include Model B15, total allowable weight 10,000 pounds, 17 to 21 passenger capacity; Model B20, total allowable weight 12,000 pounds, 21 to 25 passenger capacity, and Model B25, total allowable weight 14,000 pounds, 21 to 25 passenger capacity. Prices of standard wheelbase chassis are \$1045, \$1485 and \$1785 respectively.

NEWS

1933 Domestic Retail Sales Gain 39 Per Cent over 1932 to Total 1,770,000 Units

Dollar Value of U. S. Car Sales Verges on Billion Mark Despite Decrease in Average Selling Price from \$769 to \$643—Trucks Show Larger Increase Than Cars

DETROIT—Domestic retail sales of cars and trucks in 1933 will total 1,770,000, an increase of 39 per cent over the 1,276,812 units sold last year, year end estimates made by *Automotive Industries* indicate.

Passenger car sales in the United States increased from 1,096,399 in 1932, the lowest total since the war, to 1,510,000 in the year just ending. The percentage increase was 38 per cent. The estimated dollar value at list prices of domestic retail car sales in 1933 is \$984,000,000 against \$843,000,000, a gain of 17 per cent. The small gain in dollar value is due to the pronounced trend to the lower-priced cars which was in evidence throughout the year, with the result that the average list price of cars sold

declined from \$769 last year to \$643 in 1933.

Truck sales also show an increase of approximately somewhat larger proportions than cars, the estimated 1933 total being 260,000 against 180,413, an increase of 44 per cent over last year.

Production of Ford cars and trucks scheduled for January will be the largest for January since 1930 and will exceed the totals in every month this year, with the exceptions of June, July and August, peak production months in 1933. Production was maintained at 2000 units daily each day during the week of December 23. The production total on Thursday reached 2082, the largest daily total since September 25.

Commercial Body Code Ready for NRA Hearing

WASHINGTON—Sales below cost are barred in the proposed code of fair competition for the Commercial Vehicle Body Industry on which NRA will hold public hearing on Jan. 12, 1934. The code covers the manufacture and servicing of all sorts of commercial vehicle bodies and horse-drawn wagons.

Costs are to be determined by uniform accounting to be formulated by the Code Authority subject to NRA approval. In addition to making a long list of unethical practices unfair competition, it defines time sales terms. On sales of less than \$1000, the terms are 25 per cent cash minimum and balance in 18 months; over \$1000, 20 per cent cash and balance in 24 months maximum, the trade-in to be considered as cash in both cases. A minimum interest rate of 0.5 per cent per month on the unpaid balance is established. Surplus stocks are exempted from the prohibition against sales below cost.

Maximum hours are 40 averaged over four months with daily and weekly maximums of 8 and 48 respectively. Base minimum hourly rates are 37½ cents in the North and 35 cents in the South with females drawing five cents less in each case.

J. E. Otis, Jr., Is Elected Stewart-Warner President

CHICAGO—J. E. Otis, Jr., has been elected president of the Stewart Warner Corporation, succeeding C. B. Smith who resigned July 24 last. Mr. Otis was elected vice-president and general manager of the corporation last May. Previously, since 1923, he was vice-president of the subsidiary Alemite Corporation.

Carter Expands Plant

ST. LOUIS—Carter Carburetor Corporation is rapidly pushing to completion a large addition to its factory at 2834-46 North Spring Avenue, St. Louis, Mo.

Court OK's Production Of 5000 Willys 77's

Wilson Named Receiver to Succeed L. A. Miller

TOLEDO — Permission has been given to receivers of Willys-Overland to make from 5000 to 7000 passenger cars by Judge George P. Hahn, in Federal Court and these operations are expected to continue almost through March.

Resignation of L. A. Miller as receiver effective January 1, approved by the court and appointment of David P. Wilson, president of the Wilson Foundry and Machine Company, Pontiac, Michigan, affiliate of Willys-Overland, to succeed him in charge of active operations of the plant, brought John N. Willys, other receiver, to Toledo today for conferences with department heads on the production plans.

Financing of the passenger car production is being handled by Willys it was developed at the hearing. Testimony of Walter C. Miner, comptroller, indicated the cars can be made without loss to the receivers. His testimony was closely cross examined by George Welles, attorney for the bondholders and the trustee under mortgage. It was brought out that some changes in prices and specifications would be made in the interest of economy.

Willys-Overland Pacific Company wants 3000 cars, Willys Export Corp., 1300 and New York distributors 1000 it was shown at the hearing. Miller said he was not ready to disclose his new connections, but it was indicated here that he is going with International Harvester Co. with

which he has worked closely on truck manufacture.

Cost figures indicated quotations on materials are good to January 1, so that buying operations will be undertaken at once.

Chevrolet Plans Nationwide New Car Showings

DETROIT—Halls are being hired and entertainment engaged for a simultaneous showing of new knee-action Chevrolets in one hundred major cities in this country under factory auspices on Jan. 6, the day the New York Show opens. The shows which represent a new departure in factory announcement methods will be under direct supervision of Chevrolet zone office personnel. Cars will be announced only in those cities where shows are being held.

N. Y. Show a Sell-Out

NEW YORK—All accessory space at the New York Show has been sold and only a few spaces are left at Chicago, according to Alfred Reeves, vice-president and show manager of the National Automobile Chamber of Commerce. Mr. Reeves also reports that the demand for tickets is far in excess of last year.

Sakhnoffsky Joins Budd

PHILADELPHIA — Count Alexis de Sakhnoffsky, engineering stylist, has been added to the body designing staff of the Edward G. Budd Manufacturing Co.

President Approves Tire Makers' Code

WASHINGTON—President Roosevelt has approved the code of fair competition for the Rubber Tire Manufacturing Industry and it became effective on Dec. 25.

The code provides for factory employees a limit of 36 hr. per week over the calendar year with a restriction of 8 hr. per day and 42 hr. in any one week. Hours in excess of 36 are paid at time and a third. Maintenance crews, tire testers, firemen, etc., are limited to 40 hr. with time and a third for over time. Watchmen are limited to 84 hr. in any two week period with one day off in seven. Clerical employees getting less than \$35 per week are limited to a 40 hour average with a maximum of 48 in any one week.

Base minimum wages are set at 40 cents with weekly minimums of \$12 to \$15 depending on population.

The Code Authority is charged with making a cost survey leading to the inclusion in the code of a cost recovery formula. The code also required recommendations on time and mileage contracts, standard warranty, simplification of lines, the adoption of an open-price system, etc.

The NRA report shows that average hourly earnings have increased from 58 cents in May to 69 cents in October. Corresponding employment figures are 38,545 and 50,400.

Kennedy and Willemse SAE Banquet Speakers

NEW YORK—John B. Kennedy of Collier's and NBC fame, and Capt. Cornelius W. Willemse, formerly of the detective branch of the New York police, with C. F. Kettering, vice-president of General Motors as toastmaster, will be the headliners on the S.A.E. Annual Dinner to be held Jan. 8, at the Hotel Commodore, New York. Mr. Kennedy will talk on "Looking Ahead a Quarter of a Century" while Capt. Willemse will tell some first hand thrillers.

Hercules Motors Reports

CANTON, OHIO—Hercules Motors Corp. reports net income of \$36,352 for the quarter ended Sept. 30 against a deficit of \$24,638 in the preceding quarter and \$27,452 in the corresponding quarter last year. In the first nine months the net loss was \$32,260 against a loss of \$80,164 in the similar 1932 period.

Sales Value Up 74%

WASHINGTON—Preliminary estimates of the value of retail sales of new passenger automobiles, computed from the number of cars sold as reported by the National Automobile Chamber of Commerce, show an increase of 74 per cent for the past No-

vember over November, 1932, and a decrease of 30 per cent as compared with October this year, according to Willard L. Thorp, Director, Bureau of Foreign and Domestic Commerce.

Canadian GM Appoints Kerby Asst. Sales Mgr.

TORONTO—R. D. Kerby has been appointed assistant general sales manager of General Motors of Canada with the particular duty of directing sales and distribution of cars in the Dominion, according to an announcement of C. E. McTavish, general sales manager.

Mr. Kerby recently resigned as president of the Dominion Motors, Ltd., which formerly produced Frontenac and Rugby cars.

Louis Meier

DETROIT—Louis Meier, Sr., co-founder with his son, Julian, of the business now known as the L. M. Gear Co., died Friday at the age of 68 years. He retired from active business in 1926. L. M. Gear Co. manufacture a large part of the pre-

cision gears for General Motors.

Mr. Meier was best known for his ability as a master clock maker and exhibited at the Chicago World's Fair of 1893, a timepiece known as Meier's Wonderful Clock.

Kennedy Is N.A.C.C. Speaker

NEW YORK—John B. Kennedy, former associate editor of Collier's will be the feature speaker at the annual N.A.C.C. banquet to be held here Jan. 9. "Senator" Ford again will be the humorous speaker.

Machine Tool Orders Jump 20% in November

CLEVELAND—The National Machine Tool Builders' Association index of machine tool orders reached 82.8 for November, the highest level attained in two years and a 20 per cent increase over October. This is the largest increase in any month since the bottom in March, 1933. Normal operation is estimated at 169 so the November index indicates close to 50 per cent operation.

Motor Vehicle Registrations

as of December 31 of each year.

(These figures include tax exempt or official cars and trucks)

	Passenger Cars		Trucks and Buses		Total Motor Vehicles		Per Cent Change
	1933	1932	1933	1932	1933	1932	1933
Alabama, a	177,076	195,182	30,250b	32,218b	207,326	227,400	- 8.8
Arizona	75,300	80,099	15,500b	14,848b	90,800	94,947	- 4.4
Arkansas	118,000	120,000	17,000	16,503	135,000	136,503	- 0.3
California	1,884,117g	1,898,543g	107,941f	97,283f	1,992,058	1,995,826	- 0.2
Colorado	238,000	255,854	26,609	30,006	264,609	285,860	- 7.4
Connecticut	301,165	303,910	52,581	52,524	353,746	356,434	- 1.0
Delaware	42,587	43,647	8,477	9,410	51,064	53,057	- 3.8
Dist. of Col.	145,000	155,496	18,000	20,358	163,000	175,854	- 7.2
Florida	230,192	251,503	45,054b	38,305b	275,246	289,808	- 5.0
Georgia	279,800	245,666	50,300b	41,532b	330,100	287,198	+15.0
Idaho	79,000	82,335	11,000	14,199	90,000	96,534	- 6.8
Illinois	1,277,000	1,311,783	187,000	181,715	1,464,000	1,493,498	- 2.0
Indiana	651,828	674,230	124,499	120,733	776,327	794,963	- 2.4
Iowa	549,000	609,168	67,000	75,392	616,000	684,560	-10.0
Kansas	440,000	438,000	75,000	72,000	515,000	510,000	+ 1.0
Kentucky	259,900	261,501	33,210	34,765	293,110	296,266	- 1.0
Louisiana	189,266	198,787	43,433	43,961	232,699	242,748	- 4.1
Maine	133,137	137,319	34,577	32,649	167,714	169,968	- 1.3
Maryland	277,908	285,681	28,709	34,934	306,617	320,615	- 4.4
Mass.	685,240	694,459	103,270	107,450	788,510	801,909	- 1.7
Michigan	954,521	1,001,130	121,184	135,094	1,075,705	1,136,224	- 5.4
Minnesota	576,381	581,088	100,183	101,866	676,564	682,954	- 1.0
Mississippi	135,000	137,636	24,000	27,649	159,000	165,285	- 3.5
Missouri	579,295	619,906	99,579	99,533	678,874	719,439	- 5.6
Montana	84,000	88,665	27,500	20,508	111,500	109,173	+ 2.0
Nebraska	325,000	322,196	49,935	53,250	374,935	375,716	+ 0.2
Nevada	22,541	25,225	6,314	6,795	28,855	32,020	-10.0
New Hamp.	88,000	87,873	18,658	18,558	106,658	106,431	+ 0.2
New Jersey	717,822	722,807	126,690	139,825	844,512	862,632	- 2.1
New Mexico	60,797	62,770	15,244b	15,047b	76,041	77,817	- 2.2
New York	1,898,901	1,922,288	273,938c	370,108c	2,172,839	2,292,396	- 5.1
N. Carolina	342,624	341,321	47,782	48,487	390,406	389,808	+ 2.0
N. Dakota	128,674	129,799	25,487	24,208	154,161	154,007	+ 0.1
Ohio	1,390,000	1,432,950	160,000	169,653	1,550,000	1,602,603	- 3.1
Oklahoma	392,000	385,326	58,000	49,127	450,000	434,453	+ 3.8
Oregon, d	219,940	237,146	23,424	25,082	243,364	262,228	- 7.2
Penna.	1,407,752	1,443,896	225,953	221,337	1,633,705	1,665,233	- 2.0
Rhode Is.	118,136	114,832	19,100	19,613	137,236	134,445	+ 1.9
S. Carolina	147,644	157,534	20,561	22,055	168,205	179,589	- 6.4
S. Dakota	144,713	141,630	22,570	19,455	167,283	161,085	+ 3.8
Tennessee	276,650	267,041	31,600	29,375	308,250	297,016	+ 3.8
Texas	1,011,355	1,002,978	199,091b	197,067b	1,210,446	1,200,045	+ 0.8
Utah	85,000	83,089	18,050	16,762	103,050	99,851	+ 3.1
Vermont	65,491	69,093	8,019	8,502	73,510	77,595	- 5.4
Virginia	301,900	309,713	52,335	65,377	354,235	375,090	- 5.6
Wash., e	364,209	382,845	67,850	69,583	432,059	452,428	- 4.5
West Va.	194,270	189,823	34,732	35,419	229,002	225,242	+ 1.8
Wisconsin	567,022	588,568	107,925	111,844	674,947	700,412	- 3.6
Wyoming	45,475	46,761	10,000	9,896	55,475	56,657	- 2.1
Totals	20,678,629	21,139,092	3,075,114	3,202,730	23,753,743	24,341,822	- 2.2

a—Fiscal year from Oct. 1 to Sept. 30.
b—Buses included with passenger cars.
c—Includes taxis.
d—Fiscal year from July 1 to June 30.
e—Fiscal year ending Nov. 30.

f—Does not include approximately 140,000 light commercial vehicles under 3000 lb.

g—Includes approximately 140,000 commercial vehicles under 3000 lb.

N.A.C.C. Brief Asks Repeal of Excise Tax

**Federal Levies Offset
Economies from Design
and Production Progress**

WASHINGTON — Maintenance of present Federal excise taxes will mean that government imposed costs will cancel the cost reduction achieved through engineering and manufacturing progress, the National Automobile Chamber of Commerce told the House Ways and Means Committee in a brief filed Dec. 21 by Pyke Johnson, Chamber vice-president.

Code compliance, the brief stated, resulted in an increase of \$2,000,000 in monthly payrolls from July to September. Similar labor cost increases in other stages of manufacture, together with higher material costs are forcing price increases on new models. The brief also pointed out that despite a 10 per cent decrease in registrations since 1929, special motor vehicle taxes reached a new peak of \$1,170,000,000 in 1933, an increase of 26 per cent over 1929.

Continuing, the brief said:

"The automotive industry is opposed in principle to discriminatory taxation. We believe that whatever taxation is necessary should be general in character and should not discriminate against specific industries as the present revenue act does. The discrepancy between industries is maintained, while the burden upon the consumer is materially increased by the continuance of these special taxes. Further, these levies accentuate the already effective depression-created sales resistance to the higher priced units within the motor industry.

"Our customers, the owners and operators of 24,000,000 motor vehicles, are already subject to double, treble, and even quadruple taxation through the payment of special taxes in more than two-score forms to Federal, state, municipal and other local taxing authorities. Your subcommittee report on 'Double Taxation' presents voluble evidence on this score. The Bureau of Public Roads is even now engaged in a comprehensive survey of the entire varied field of motor vehicle taxation.

"State road building and highway bond service policies are dealt a severe blow by the invasion of the Federal government into the field of special motor vehicle taxation. Direct and indirect employment on state and local road building must be curtailed proportionately. Nearly 84 per cent of the billion dollars in state highway bonds issued from 1921 to 1930 depend upon tolls, gasoline and registration taxes for payment and interest. Wherever this revenue tends to diminish or dry up, then the states must resort to general property taxation in order to meet their obligations.

"The automotive taxes are a tax upon necessity. The motor vehicle is used almost entirely for essential transportation purposes. Labor depends upon it for a new mobility in seeking employment. Farmers use 26 per cent of all motor trucks, and nearly one out of every five passenger cars.

"The Federal excise taxes bear most heavily upon the small income class. Two-thirds of all the cars of the country are purchased by persons with an income of less than \$3,000 a year. The average price of passenger cars at the factory in 1933 was \$630, and the average price of trucks at the factory was \$645. More than 7,250,000 cars now running are more than seven and a half years old."

Green Files Ford Charges

WASHINGTON—A report charging Ford Motor with violation of the collective bargaining provisions of N.R.A. in the Edgewater strike, has been filed with N.R.A. by William Green, president of the American Federation of Labor. The report is said to be accompanied by affidavits.

Grant Heads New GM Sales Section

DETROIT, MICH. — Reorganization of the staff of the General Motors central sales section has been completed it has been learned. The Sales Section, as formerly, is under the supervision of R. H. Grant, General Motors vice-president in charge of sales.

Heading the various divisions are Jack Dineen, in charge of the sales and service section, S. D. Hopkins in charge of dealer and budget section (financial), and W. W. Lewis, as formerly, in charge of the advertising section.

The division comes under the control of W. S. Knudsen, executive vice-president, General Motors Corp.

Thomas Finnegan

CHICAGO—Thomas Finnegan, 51, president of the American Brakeblok Corporation, died here of a heart attack on Dec. 25. Mr. Finnegan was also the senior vice-president of the American Brake Shoe and Foundry Company and president of the American Brake Shoe and Foundry of California.

Studebaker Prices Up

SOUTH BEND—Prices on Studebaker cars have been increased by \$20 to \$50. Fourth quarter shipments will approximate 19,000 units.

Tentative Program for S. A. E. Annual Meeting

*Book-Cadillac Hotel, Detroit,
January 22-25, 1934*

Monday, January 22

- 10:00 A.M.—Transportation and Maintenance
- Abuses on the Road by Operators—R. A. Bogan, Greyhound Management Corp.
- Front Wheel Stability in the Interest of Public Safety—Walter A. Olen, The Four Wheel Drive Auto Co.
- 2:00 P.M.—Motorcoach and Motor-Trucks
- Notes on Steering—F. F. Chandler, Ross Gear and Tool Co.
- Multi-Range Transmission—C. D. Peterson, Spicer Manufacturing Co.
- 8:00 P.M.—Student Session
- Television, Its Fundamental Physical Principles—Dr. J. O. Perrine, American Telephone and Telegraph Co.

Tuesday, January 23

- 10:00 A.M.—Diesel
- Recent Development of Water and Oil Cooling Devices for Diesel Engines—F. M. Young, Young Radiator Co.
- 10:00 A.M.—Aircraft
- Acoustics and the Airplane—Stephen J. Zand, Sperry Gyroscope Co.
- The Theory of Rotating-Wing Aircraft—J. B. Wheatley, National Advisory Comm. for Aeronautics.
- 2:00 P.M.—Aircraft-Engines
- Operation of Multi-Cylinder Engine in Altitude Chamber—M. E. Merriam, Fiat Co.
- A New Instrument for Engine Research—

Prof. C. Fayette Taylor, Massachusetts Institute of Technology.
Photographic Studies of Combustion in a High-Speed Compression-Ignition Engine—A. M. Rothrock, National Advisory Committee for Aeronautics.

7:45 P.M.—Business Session

8:00 P.M.—Body Session

- Exterior and Interior Appointments—W. G. Haarz, Graham Paige Motors Corp.
- New Theory of Exterior Surface Development—E. C. DeSmet, Hudson Motor Car Co.

Wednesday, January 24

- 10:00 A.M.—Noise Symposium
- Tire Noise—A. W. Bull, U. S. Tire Co., Inc.
- Muffler Noise—E. G. Gunn, Walker Manufacturing Co.
- Noise Treatment in an Automobile—T. M. Prudden, Pacific Mills.

Prepared Discussion

- Body Noise—Commander W. Briggs, General Motors Proving Ground.
- Analysis of Intake Silencer Problems—J. O. Almen, General Motors Research Laboratories.

2:00 P.M.—Engines

- Engine Structures—E. R. Jacoby, Continental Motors Corp.
- Power Possibilities—R. N. Janeway, Chrysler Corp.
- The Economy Fallacy—E. H. Shepard, Chevrolet Motor Co.

8:00 P.M.—Passenger Car

- A Symposium on Independent Springing.

Thursday, January 25

10:00 A.M.—Electrical Equipment

- Some Problems of Automotive Radio—Virgil M. Graham, Stromberg-Carlson Tel. Mfg. Co.
- Modern Headlighting Requirements—R. N. Falge, Guide Lamp Corp.
- The Well Lighted Car—W. C. Brown, Gen. Elec. Co.
- Mechanical Construction and Performance of Electrical Equipment—L. Boelter, University of California.
- A Résumé—and Some Conclusions—W. M. Johnson, General Electric Co.

12:30 P.M.—Production Luncheon

- What NRA Means to the Automotive Manufacturer—David Beecroft, Bendix Aviation Corp.

2:00 P.M.—Production

- External Broaching Applications in Current Production—Joseph Geschelin, Engineering Editor, Automotive Industries.
- Cost Accounting in Automotive Production—G. D. Bailey, Detroit Branch of Ernst & Ernst.

2:00 P.M.—Fuels and Lubricants

- Present Status of the Extreme Pressure Lubrication Problem—Dr. O. C. Bridgeman, Bureau of Standards.
- Chassis Lubrication—H. E. Churchill, Studebaker Corp.
- Chassis Lubrication—A. J. Blackwood and A. C. Spencer, Jr., Standard Oil Development Co.

7:00 P.M.—Dinner

- Detroit Section cooperating in climax event.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

There was further improvement in general business last week. Practically all lines of industrial activity made a better showing than in the preceding week, and many of them were operating at a higher level than a year ago.

Commodity Prices Lower

The Guaranty Trust Company's preliminary index of business activity for November stood at 64.5, as against 66.2 for the preceding month and 58.3 a year ago. The Company's index of wholesale commodity prices on Dec. 15 was 49.8, as against 51.0 a month earlier and 33.9 a year earlier.

Car Loadings Up

Railway freight loadings during the week ended Dec. 16 totaled 554,832 cars, which marks an increase of 17,329 cars above those during the preceding week, an increase of 39,063 cars above those a year ago, and a decrease of 26,338 cars below those two years ago.

More Groceries Sold

According to the Department of Commerce, grocery store sales during November were about 1 per cent higher in value than those in the corresponding period last year. The decrease of 1.7 per cent below those in the preceding month approximated the normal seasonal decline.

Employment Decreases

Employment in manufacturing industries throughout the country during November decreased by about 3.5 per cent and payrolls declined by 6.2 per cent. However, the November level of employment was about 20 per cent above that a year ago.

Production of electricity by the electric light and power industry in the United States during the week ended Dec. 16, was 5.2 per cent above that a year ago.

Life Insurance Trend

The volume of ordinary life insurance sales during this year is estimated to be below that during 1932. However, the trend in recent months has been steadily upward.

Professor Fisher's index of wholesale commodity prices for the week ended Dec. 23 stood at 71.4, as against 72.0 the week before and 71.7 two weeks before.

Bill Holdings Lower

The consolidated statement of the Federal Reserve banks for the week ended Dec. 20 showed decreases of \$3,000,000 each in holdings of bills bought in the open market and in holdings of discounted bills. Holdings of government securities remained unchanged.

partnership, when working beyond 44 hours per week, may perform the work or take the place of any employees subject to the maximum hour limitations of the code." Minimum store hours are set at 52 unless they were less on July 1, 1933, and stores must be closed on Sundays and generally observed holidays.

Steel Buying Enjoys Spurt as 1933 Ends

Automotive Consumers Well Supplied on Grades Subject to Jan. 1 Price Increases

NEW YORK—The Code Authority's admonition that fourth-quarter steel contracts must be billed before the end of the year, which means that virtually all steel rolled this week must be loaded before midnight of Dec. 31, has infused into the last-week-of-the-year steel mill activities animation not even exceeded during the peak of the best steel years on record.

In some of the finishing mills mechanical capacity and manpower are being taxed to the utmost, and with weather conditions none too propitious for loading and hauling, few tears will be shed if the first fortnight of the new year, as generally predicted, brings a period of lessened demand upon production and managerial supervision.

About Jan. 15, it is thought, sufficient orders from motor car manufacturers and parts makers will have accumulated for 1934 model material to resume activities at a fairly satisfactory operating rate which is looked for to improve with the approach of February.

Of some products, such as cold-finished bars, the price of which was advanced \$3 a ton effective Jan. 1, automotive consumers have provided themselves before the rise with ton-nages that will carry them for some time and will undoubtedly delay fresh commitments. Prices for automotive alloy steels, because of the higher bar market as well as recent mark-ups of most of the ferroalloys, rule strong.

Moreover, a marked expansion in the automotive consumption of this class of steels is looked for in 1934. Somewhat more covering by non-integrated sheet rolling and finishing mills of their semi-finished steel requirements is looked for in January, most of these having worked up their reserves. The scrap market, still considered by many as an unfailing barometer, has gone into higher ground.

PIG IRON—Automotive foundries found it for the most part advantageous to take in what iron was due them on fourth-quarter contracts and are relatively well stocked for initial 1934 melts.

TIN—With the London Metal Exchange closed on the first two days of this week, the market here was slow in getting under way and virtually unchanged at the opening from last week's close of 52.80c.

LEAD—Fairly active and unchanged.

ZINC—Dull and unchanged.

Approved Jobber Code

(Continued from page 798)

Members of the trade may appeal for relief where the uniform classification of accounts works unjust hardship. Allowances may also be made for differences in transportation costs. All customers in the same classification must get the same prices. Cash discounts are limited to 2 per cent. Close-outs and clean-ups must be approved by the Code Authority. Consignment is unfair without Code Authority approval. Misbranding, misrepresentation, false billing, commercial bribery, inducing breach of contract, free deals, defamation of competitors, etc., are unfair competition. Coercion "in any form whatsoever or

through the instrumentality of any devices whatsoever is unfair competition."

The Code Authority consists of 22 members including five representatives each of MEWA and NSPA, and three each of the Automotive Electric Association, National Wheel and Rim Association, National Automotive Parts Association and the Automotive Engine Rebuilders Association.

The base minimum wage is set at 40 cents per hour with a minimum of \$14-\$15 per week depending on population. Base maximum hours are 44 per week and eight hours in any one day. For inventory purposes, 48 hours per week are permitted for two weeks in each six months. "No executive, employer, or partner in a

1933 a Year of Improving Conditions, Sloan States

Approves Experimenting Economically if It Is Done with an Open Mind

NEW YORK—"Irrespective of how we may react individually to the various economic proposals of the year," General Motors president A. P. Sloan, Jr., said in his New Year's statement, "dramatic as they have been and full of possibilities in their influence on our future, to my mind one fact rises above the mass of conjecture, theories and experiments that we have before us. That fact is the world at large has materially improved its position, and has been improving it for over a year."

"I referred to the proposals of the year and their influence, in an economic sense, on our future. I have a very strong conviction that all such proposals should be intensively examined, without prejudice and with an open mind; that industry should co-operate with Government, having the objective of perpetuating those things that give promise of improving our social order and of eliminating those things that do not appear to give such a promise."

"Experimentation can be conducted blindly or with an open mind. In the same way reliance upon past experience can be blind or open minded. We are living in an era characterized by swift movements—social as well as economic. We must strive to keep both an open mind and an open heart."

"If all do so, I am sure that we will preserve in a wholesome sense the initiative, courage and aggressiveness of the individual. After all, it is these qualities that have made this country what it is, with a standard of living that is the envy of all other peoples of the world. These qualities are not to be blindly exalted but intelligently nourished."

"Looking forward into next year, no one can possibly be so wise as to predict with certainty the trend of business activity. There are many important influences that may be arbitrarily used—the economic consequences of which will have an all important bearing. So far as I am concerned, in view of existing circumstances, that is as it should be. Further, I am satisfied that what is done will be actuated by the most sincere desire to promote the common good and that with it all American democracy will find abundant courage to deal with those proposals which will not stand the acid test of analysis and experience."

Houdaille Shifts Getler

DETROIT — Charles Getler, vice-president of Houdaille-Hershey Corp., and president and general manager of one of its Detroit subsidiaries, General Spring Bumper Corp., here-

after will devote all of his time to the affairs of the parent company. Vern R. Drum, who has been made vice-president in charge of manufacturing operations of Houdaille-Hershey, will take over the management of General Spring Bumper.

New Chevrolet Faster, Longer and Heavier

DETROIT—According to posters on Chevrolet retail store show windows in Detroit the new cars in addition to knee action wheels, will have longer wheelbases with larger bodies and increased weight. A considerable redesign of the engine is indicated by the preliminary posters, which perhaps underlines the claim of a higher top speed for the new cars. The posters also indicate that a completely new frame design has been adopted.

Ainsworth Declares Dividend

DETROIT — Ainsworth Manufacturing Company has declared a special dividend of 50 cents a share on common stock, payable Dec. 27, to stock of record on Dec. 22. A similar dividend was paid on March 15, 1932.

Gartley Heads Graham Distributorship in N. Y.

NEW YORK — Announcement of the appointment of P. C. Gartley as Graham distributor in New York City has been made by Robert C. Graham, vice-president of the Graham Page Motors Corporation. Mr. Gartley formerly was middle west distributor for the Willys Overland Company, with headquarters in Chicago. Quarters of the new distributorship will be at Broadway and Sixty-second Street.

Mr. Gartley is a veteran of automobile merchandising. Prior to his services in Chicago, he was general sales manager of Willys Overland. He is well known not only in New York and the Eastern States but also in the Middle West.

Young Resumes Dividends

DETROIT—L. A. Young, president of L. A. Young Spring and Wire Corp., has announced that the company will resume dividend payments in the first quarter of 1934. The last payment of 25 cents a share was made in January this year. It will be the company's policy, he stated, to pay out in dividends virtually all earnings, since surplus is adequate.

CALENDAR OF COMING EVENTS

AUTOMOBILE SHOWS

New York	Jan. 6-13
Toronto, Ont.	Jan. 13-20
Milwaukee, Wis.	Jan. 13-20
Newark, N. J.	Jan. 13-20
Cleveland, Ohio	Jan. 13-20
Buffalo, N. Y.	Jan. 13-20
St. Louis, Mo.	Jan. 14-20
Cincinnati, Ohio	Jan. 14-20
Philadelphia, Pa.	Jan. 15-20
Brooklyn, N. Y.	Jan. 15-20
Detroit, Mich.	Jan. 20-27
Hartford, Conn.	Jan. 20-27
Baltimore, Md.	Jan. 20-27
Boston, Mass.	Jan. 20-27
San Francisco, Calif.	Jan. 20-27
Montreal	Jan. 20-27
Pittsburgh, Pa.	Jan. 20-27
Montreal, Canada	Jan. 20-27
Rochester, N. Y.	Jan. 22-27
Harrisburg, Penna.	Jan. 24-27
Chicago	Jan. 27-Feb. 3
Washington, D. C.	Jan. 27-Feb. 3
Toledo, Ohio	Feb. 3-9
Camden, N. J.	Feb. 3-10
Los Angeles	Feb. 3-11
Omaha, Neb.	Feb. 5-9
Lansing, Mich.	Feb. 7-10
Rapid City, S. D.	Feb. 7-10
Springfield, Ill.	Feb. 8-10
Kansas City, Mo.	Feb. 10-17
Syracuse, N. Y.	Feb. 10-17
Black Hills, S. D.	Feb. 15-17
Des Moines, Ia.	Feb. 19-24
Evansville, Ind.	Feb. 20-24
Denver, Colo.	Feb. 20-28

OTHER SHOWS

Road Show, Chicago	Jan. 22-27
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CONVENTION AND SHOW

Natl. Assoc. of Engine and Boat Mfrs., New York City	Jan. 19-27
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CONVENTIONS

American Road Builders' Association, Chicago	Jan. 22-27
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MEETINGS

Natl. Automobile Dealers Assoc. Meeting, New York City	Jan. 8
Rubber Assoc. Meeting and Banquet, New York	Jan. 8
S.A.E. Annual Dinner, New York	Jan. 8
Motorcycle & Allied Trades Assoc. Annual Meeting, New York	Jan. 10
S.A.E. Annual Meeting, Detroit	Jan. 22-25
National Automobile Dealers Assoc., Chicago	Jan. 29

NEW YORK SHOW WEEK EVENTS

International Registration, N.A.C.C. Offices	Jan. 6
International Luncheon, N.A.C.C. Offices	Jan. 8
National Automobile Dealers Assoc., New York	Jan. 8
N.A.C.C. Export Managers Meeting, N.A.C.C. Offices	Jan. 9
N.A.C.C. Annual Banquet, Hotel Commodore, New York	Jan. 9
N.A.C.C. Directors' Meeting, N.A.C.C. Offices	Jan. 10

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BUYERS' GUIDE

Automotive Products and Factory Equipment Manufactured by Advertisers in This Issue

See Alphabetical List of Advertisers on Page 31

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Bolts & Nuts Upson Nut Div. Republic Steel Corp.	Compressors, Air Bendix - Westinghouse Automotive Air Brake Co.	Gaskets <i>Felt</i> American Felt Co.	Hotels Roosevelt Hotel	Paints <i>Heat Resisting</i> American Chemical Paint Co.
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